WISCONSIN STATE LEGISLATURE COMMITTEE HEARING RECORDS

1995-96
(session year)

Assembly
(Assembly, Senate or Joint)

Committee on Veterans and Military Affairs (AC-VMA)

Sample:

Record of Comm. Proceedings … RCP
- 05hr_AC-Ed_RCP_pt01a
- 05hr_AC-Ed_RCP_pt01b
- 05hr_AC-Ed_RCP_pt02

- *Appointments … Appt*
- **

- *Clearinghouse Rules … CRule*
- **

- *Committee Hearings … CH*
- **

- *Committee Reports … CR*
- **

- *Executive Sessions … ES*
- **

- *Hearing Records … HR*
- **

- *Miscellaneous … Misc*
- **95hr_AC-VMA_Misc_pt05**

- *Record of Comm. Proceedings … RCP*
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Description of the Proposed Action and Alternatives (DOPAA) for the Hardwood Range Expansion and Related Airspace Actions

AIR NATIONAL GUARD READINESS CENTER
Environmental Division
Andrews AFB, MD 20331-5157

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for the
Hardwood Range Expansion and Related Airspace Actions

Prepared for:

AIR NATIONAL GUARD READINESS CENTER
Environmental Division
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ABBREVIATIONS AND ACRONYMS

AGL	Above Ground Level
AMRAAM	Advanced Medium Range Air-to-Air Missile
ANG	Air National Guard
ANGRC	Air National Guard Readiness Center
AG	Airlift Group
AW	Airlift Wing
BS	Bomb Squadron
BW	Bomb Wing
CRTC	Combat Readiness Training Center
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DOPAA	Description of the Proposed Action and Alternatives
DoD	Department of Defense
DOC	Designated Operational Capability
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FG	Fighter Group
FS	Fighter Squadron
FW	Fighter Wing
FL	Flight Level
FAC	Forward Air Controller
IFR	Instrument Flight Rules
IR	Instrument Route
KIAS	Knots Indicated Airspeed
LOWAT	Low-Altitude Air-To-Air Training
MSL	Mean Sea Level
MOA	Military Operations Area
MTR	Military Training Route
mm	Millimeter
NGB	National Guard Bureau
NM	Nautical Mile (1.15 statute miles)
NEPA	National Environmental Policy Act
TG	Test Group
USAF	United States Air Force
VFR	Visual Flight Rules
VR	Visual Route
WG	Wing

1. PURPOSE AND NEED FOR THE ACTION

1.1 INTRODUCTION

The National Guard Bureau (NGB), through the Air National Guard Readiness Center (ANGRC), proposes to expand the land acreage of the Hardwood Air-to-Surface Gunnery Range (hereafter referred to as Hardwood Range) and its training capabilities, create new military training airspace associated with the Hardwood Range, and reassess the annual utilization of the airspace. This Description of Proposed Action and Alternatives (DOPAA) has been prepared to support the scoping process for a Draft Environmental Impact Statement (DEIS) addressing the Proposed Action. This DOPAA presents the proposal and the viable alternatives for an expansion of the range and new and modified training airspace that military units require to develop and maintain wartime proficiency standards. It also describes the military's training requirements and the aircraft that would operate within the proposed airspace, the type of missions typically flown within the airspace, and the operational requirement for airspace.

1.2 PURPOSE OF THE ACTION

The Proposed Action would expand the land area associated with the Hardwood Range, and includes construction of a new area for potential target locations and an assault landing strip and drop zone. The Proposed Action also implements changes in military airspace configuration and utilization to respond to changes in military readiness requirements. The proposal would expand the upper, lower, and lateral boundaries of the restricted airspace directly associated with the Hardwood Range [Restricted Area 6904B (R-6904B)], increase the ceiling of R-6904A, and establish six new Military Training Routes (MTRs) south of the range that would encompass two ground tracks. The configuration of one other MTR west of the range (VR-1616) and one Military Operations Area (MOA) south of the range (Volk South) would remain unchanged, but would have increased utilization. The additional land acreage and airspace would allow multi-directional access to the range and facilitate utilization of the training capabilities of the expanded range.

1.3 NEED FOR THE ACTION

Several operational requirements generate the need for this action. The first is military readiness. The declining Department of Defense (DoD) budget is causing the active duty military force to reduce its aircraft inventory, personnel force, and number of bases. The Air Reserve Components, such as the Air National Guard (ANG), are also reducing in size but at a slower rate. As a result, the ANG's percentage of the total force (i.e., active duty, ANG, and Air Force Reserve) is increasing. Because of this, ANG units are being tasked for increasingly prominent responses to wartime situations as these units assume roles and missions formerly assigned to active duty units. Based on current and projected Congressional funding, global military force projection will increasingly rely on the ANG. Therefore, the ANG must maintain the current size of its force. To rapidly and effectively respond when called upon, ANG units must continue training to the highest standards established by the United States Air Force (USAF) for active duty units.

Developments in military weapons systems, such as advanced long range air-to-surface weapons, along with reductions in force structure, have altered USAF doctrine and tactics. These changes often necessitate modifying training ranges and/or modifying existing airspace and creating new airspace for training purposes.

Recent technological improvements at the Volk Field Combat Readiness Training Center (CRTC) make it possible for military flying units to accomplish a broad range of training they are unable to accomplish at their home fields. A drop zone and assault landing strip are required to provide airlift aircraft, such as the C-130, an area to practice insertions/extractions of airlift cargo. Drop zones are areas designated to airdrop cargo. Assault landing strips are designed to develop proficiency through realistic short field landings. The actions included in this proposal would increase the military's training efficiency by offering consolidated training opportunities at a central location. Appendix A presents the current operational training requirements relevant to the Proposed Action.

The second operational requirement is safety. The Volk Field CRTC currently has an exemption that allows aircraft in a weapons delivery pattern to fly over non-government lands. The proposed expansion would ensure that many flights would remain over land owned or controlled by the government to further increase safety for the civilian population near the range. In addition, the increased acreage will ensure that the safety footprint (i.e., an area beyond which no training ordnance would fall) would remain on government land. The proposed additional acreage would satisfy military training requirements but would not obviate the need for the current operating exemption.

Within this context, the NGB proposes to expand the Hardwood Range and associated restricted airspace, modify existing airspace, and create new military training airspace for the military participants who use the Hardwood Range and the associated airspace.

Equally important is responsible stewardship of unit funding. Distances to some of the existing military airspace that support use of the Hardwood Range and associated air-to-air tactics training airspaces are not within the criteria suggested in the *USAF Airspace Master Plan*.

The Proposed Action has a twofold objective. First, it would provide the training airspace for aircrews to develop the aviation skills that would be required to respond effectively to worldwide wartime situations. Second, the Proposed Action would create and modify airspace closer to military units using the airspace. This would allow each unit to accomplish more training on each flight, which would help reduce the expense incurred in deploying to more distant areas.

1.4 BACKGROUND ON USE OF MILITARY AIRSPACE AND RANGES

Training requirements for active duty and reserve components of the military are specified in regulations written by their host commands (e.g., Air Combat Command, Air Mobility Command, Air Education and Training Command, etc.). These regulations specify the type, quality, and frequency of training that aircrews are required to develop and maintain flight proficiency to meet expected wartime tasking and contingency operations.

The Federal Aviation Administration (FAA) designates airspace away from congested areas for certain military training activities. One such type airspace is designated restricted airspace. A Restricted Area is airspace designated in Federal Aviation Regulation 73 within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Restricted Areas shall be designated when necessary to confine or segregate activities considered to be hazardous to non-participating aircraft. The airspace directly associated with the Hardwood Range Air-to-Surface Gunnery Range is Restricted Area R-6904.

Another type of airspace is termed a Military Operations Area (MOA). A MOA consists of an airspace of defined vertical and lateral boundaries in which aircraft can perform military training activities separated from instrument flight rule (IFR) traffic, including such practice activities as aircraft intercepts, turning and evasive maneuvers, and air combat training. MOAs are designated by the FAA and serve to warn visual flight rule (VFR) traffic that military activities may be taking place in the airspace. The floor of a MOA may be near ground level and the ceiling up to but not including 18,000 feet mean sea level (MSL).

A Military Training Route (MTR) is a military air traffic corridor designated by the FAA for low-altitude military operations at airspeeds in excess of 250 knots. MTRs are typically 100 to 350 nautical miles (NM) long, three to 20 NM wide, and extend vertically from near ground level to as high as 15,000 feet above ground level (AGL). MTRs provide airspace to practice navigational skills over a variety of terrain and serve the military as their routes to access MOAs, ranges, and other destinations. Separation of MTRs from commercial air routes enhances general aviation safety. MTRs include two types and are identified as either an Instrument Route (IR) or Visual Route (VR) followed by a numerical designation. IR denotes instrument flight rules apply along the route, whereas VR denotes visual flight rules apply. An "X" preceding the IR or VR denotes that the MTR is not yet depicted on aeronautical charts or approved by the FAA.

A variety of military aircraft and aircrew training can take place in a MOA and/or on an MTR. During a single training flight (or sortie), a combination of airspace training events are typically accomplished in several MOAs and MTRs between takeoff and landing.

The use of an air-to-surface gunnery range, such as the Hardwood Range, is typically part of a larger set of training objectives included in a single training flight. The use of a range is part of a series of training activities linked together and accomplished while a sortie is flown through several MTRs and MOAs on the way to the range. Certain types of aircrew training missions involve the simulated release of practice ordnance or the actual firing of weapons associated with the aircraft. This is only done in restricted airspace under controlled conditions to eliminate hazards to non-participating aircraft and to ensure the safety of persons and property on the ground.

Civilian and general aviation aircraft can traverse MOAs and MTRs unrestricted while on a VFR flight plan. To enhance safety, schedules of military training activities on MOAs and MTRs are available through the local flight service station to any pilots desiring to traverse military airspace.

1.4.1 Training Associated with the Hardwood Range

Military units located within a usable operating distance of Volk Field, Wisconsin use the Hardwood Range to accomplish air-to-surface training. Air-to-air and air-to-surface tactics support training is accomplished in the Falls 1, Falls 2, Volk West, Volk East, and Volk South MOAs. Low-altitude training to support air-to-surface requirements is currently accomplished on VR-1616 and VR-1650. The existing airspace is shown in Figure 1-1.

The Volk Field CRTC is responsible for scheduling and managing the Restricted Area, and the MOAs and MTRs associated with the Proposed Action. The 114th Fighter Group (FG) (Sioux Falls, SD), 128th Fighter Wing (FW) (Madison, WI), 132 FW (Des Moines, IA), 183 FG (Springfield, IL), and the 185 FG (Sioux City, IA) would use the airspace regularly. These units fly F-16 C/D aircraft. In addition, A-10, B-1, B-2, B-52, F-14, F-15, and F-18 aircraft are representative of the type aircraft from numerous military units that would conduct periodic training in the airspaces.

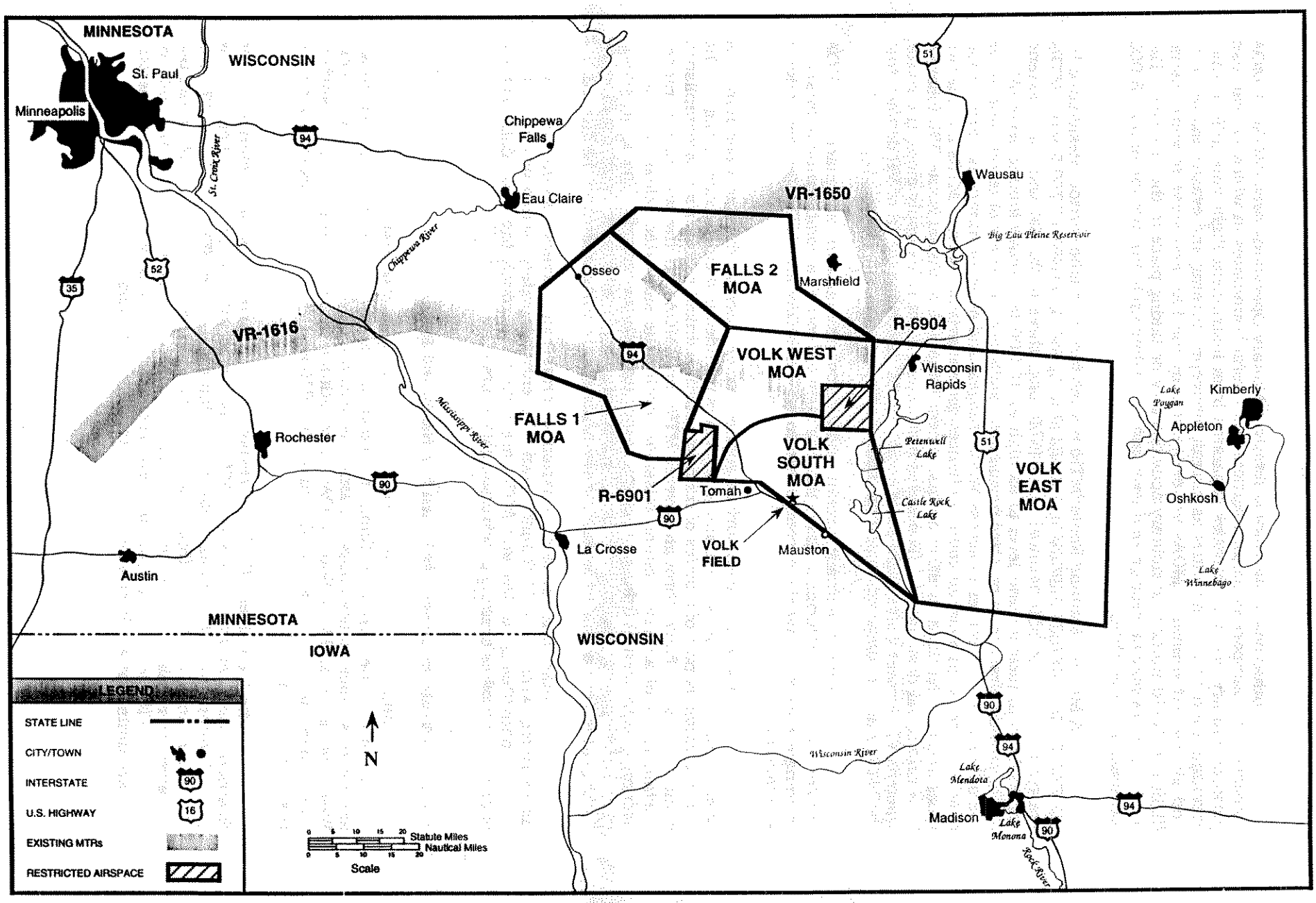

Figure 1-1. Existing Airspace Associated with the Hardwood Range

Aircraft generally enter the Hardwood Range from high, medium, or low altitudes by way of MOAs and MTRs. A high-altitude entry may be desired because of poor weather conditions, fuel conservation considerations, and/or training requirements. A low-altitude entry is normally chosen to accomplish low-altitude training en route to the range. To achieve realistic tactical weapons delivery training on the range, pilots need to approach the target area and release the ordnance from multiple directions. This training can be accomplished by entering the range from a low altitude using an MTR or from an MOA whose altitude structure allows both a high- and low-altitude entry into the range. In addition, multiple direction entries require land area sufficiently large to ensure ordnance will remain on the range.

Many air-to-surface gunnery ranges are configured with conventional and tactical target arrays. Each have different training purposes and size requirements. Conventional ranges are designed and used to develop and/or maintain basic weapons delivery skills. These ranges typically include one or more targets with concentric circles emanating from the target, two sighting towers to score ordnance deliveries, and a main control tower. Aircraft fly predetermined patterns to help develop basic gunnery proficiency. Tactical ranges, which are typically located immediately adjacent to conventional ranges, offer conditions that closely approximate the wartime conditions to which the pilot may be tasked. Tactical targets typically are junk military equipment such as aircraft frames, armored tanks, jeeps, etc. Tactical targets may be partially concealed to train aircrews for target acquisition while at low altitude. To achieve realistic weapons delivery training on a tactical range, pilots need to be able to approach the target area and release the ordnance from multiple directions. This training can be accomplished by entering the range from low-altitude using an MTR or MOA whose altitude structure allows both a high- and low- altitude entry into the range. Multiple direction entries require land area sufficiently large to ensure that ordnance used in training will remain on the range.

Because of the small size and orientation of R-6904B, aircraft primarily release ordnance on an east-west orientation (see Figure 1-2). That limitation reduces the potential for tactical training because it contributes to problems associated with memorized pilot responses from repeated identical missions. USAF doctrine requires pilots to train to conditions as realistic as possible. In combat, pilots would approach targets from multiple directions, whenever possible, to defeat and confuse enemy threats. In addition, the current vertical limit of R-6904 will not permit high-altitude dive bomb release training which Air Combat Command requires for altitudes between flight level (FL) 180 (approximately 18,000 feet MSL) and FL 310 (approximately 31,000 feet MSL). Consequently, training capabilities at the Hardwood Range would provide more realistic war-like training if the range were expanded laterally and vertically.

To achieve multiple attack axis training from low and high altitudes, aircraft need to enter the range from some form of protected airspace, such as a MOA or MTR. Because of their distance from the start point, and their average sortie duration of 1.33 hours, the 132 FW and the 183 FG are unable to use MTR entry very often. VR-1650 is not normally used by units from the south because the start point is too far away. Consequently, units are using VR-1616, but the route's start point is of such distance that it reduces the amount of training events many units can normally accomplish on each mission. The Volk South and Volk West MOAs can be used without modifying the current vertical or lateral configurations to accommodate north/south headings while using the proposed expanded range.

Actions are necessary to correct the operational deficiencies. These include increasing the land area of the Hardwood Range, increasing the lateral and vertical limits of R-6904B (the airspace directly associated with the Hardwood Range), establishing six new MTRs that would encompass two ground tracks, increasing the upper altitude of R-6904A, and reassessing the annual utilization of the Volk South MOA and VR-1616.

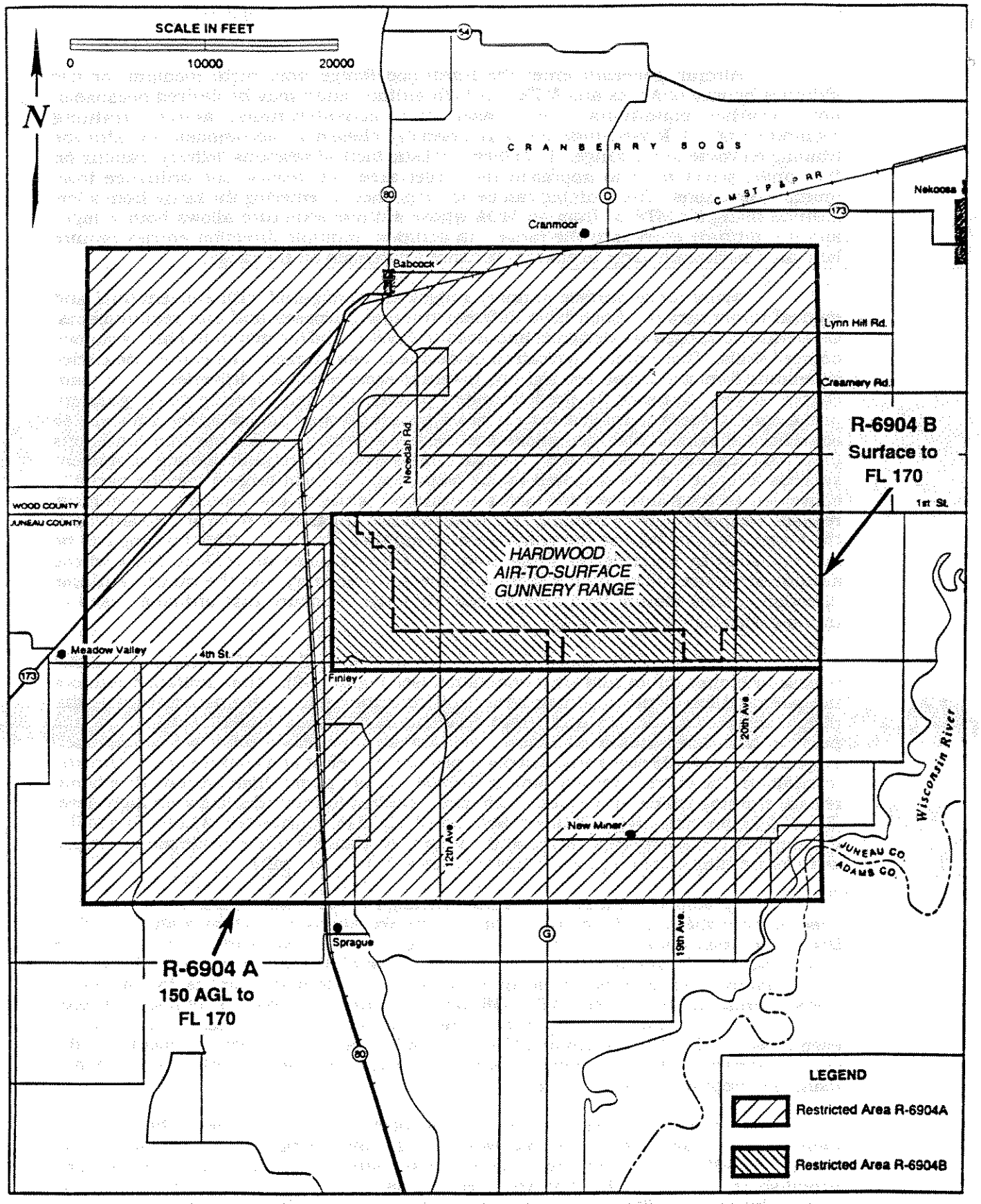

Figure 1-2. Location of Restricted Airspace R-6904 Associated with the Hardwood Range

1.4.2 Airspace Requirements

Military flying units require airspace for pilots to attain and maintain proficiency standards established by the USAF to support the National Command Authority (President of the United States and the Secretary of Defense). This basic requirement includes airspace for low, medium, and high altitude air-to-air training and airspace for air-to-surface weapons or ordnance delivery training. Hardwood Range provides air-to-surface training for the Combat Readiness Training Center based at nearby Volk Field. ANG units deployed to Volk Field CRTC, as well as ANG, USAF, Navy, Marine Corps, and Army units from throughout the United States, use Hardwood Range daily and periodically for special training exercises.

The *USAF Airspace Master Plan* suggests standards for airspace requirements. It addresses USAF airspace requirements in every area of the country, and for every mission that has airspace needs. The plan provides a reference for intercommand and interservice cooperation and coordination of airspace acquisition, usage, modification, and retention. In particular, this plan, in conjunction with other military service efforts, establishes the basis for a comprehensive analysis of total DoD requirements, and will assist airspace managers in pursuing a coherent airspace acquisition plan.

Criteria for airspace to meet these requirements are found in several military and FAA documents. These criteria are designed and selected to minimize the impact of military training airspace on the overall National Airspace System and other airspace users. The criteria are applied in the following order of priority: existing airspace, modifications to existing airspace, and new airspace.

The ANGRC assessed all air-to-surface gunnery ranges and airspace within a 200 nautical miles (NM) radius of Volk Field. The review concluded that the Hardwood Range would need to be expanded, new military training routes from the south and southwest would be required, and modifications to existing military restricted airspaces also would be required.

The potential options and issues associated with each criteria are summarized below:

Existing Low/Medium Altitude Airspace. Existing MOAs contiguous with the Hardwood Range are large enough laterally and vertically to satisfy training requirements. The Volk South MOA would help satisfy the requirement to vary range entry headings to accomplish realistic training. However, multiple axis attacks would require additional land to accommodate the weapons safety foot print (safety margin to minimize the probability of military ordnance coming to rest on private property). The 8,000-foot MSL floor of the Volk East MOA precludes low-altitude entries into the Hardwood Range from the east.

Modify Existing Airspace. The ANGRC reviewed the possibility of modifying the vertical and lateral boundaries of R-6904B. The ANGRC determined the modifications could be accomplished if additional land was acquired.

Create New Airspace. The ANGRC reviewed the feasibility of modifying existing airspace to meet training requirements before assessing the necessity for new airspace. The ANGRC determined that relocating Hardwood Range was neither economically nor environmentally feasible. The proposed MTRs offer the training environment that more closely approximates the regions to which using units could be sent to respond to wartime situations. In addition, the routes are closer to military units

south of the Hardwood Range, thus allowing the opportunity to conduct multiple training events for each flight. The Proposed Action would establish two airspace corridors having six different MTR designations and achieve the desired training requirements while avoiding populated and/or known environmentally sensitive areas and complying with FAA safety and clearance criteria.

1.4.3 Narrowing Criteria

Military units need airspace to accomplish advanced medium range air-to-air missile (AMRAAM), high altitude, medium altitude, low-altitude, and weapon delivery training. The criteria for each airspace as suggested in the *USAF Airspace Master Plan* and other applicable documents, are summarized below:

- AMRAAM—The airspace should be within 100 NM of Volk Field or a unit's home field, be at least 70 NM long and 60 NM wide, and extend vertically from 500 feet AGL to a flight level of 50,000 feet (FL 500).

- High-altitude dive bomb release—The restricted airspace associated with the Hardwood Range must extend vertically and laterally to completely contain the flight path of any ordnance. The ANG Range Master Plan recommends a minimum upper altitude of FL 250 for ANG ranges.

- High-altitude training airspace—The airspace should be within 100 NM of Volk Field or a unit's home field, be 70 NM long and 60 NM wide, and extend vertically from FL 250 to FL 450.

- Medium altitude training airspace—The airspace should be within 100 NM of Volk Field or a unit's home field, be 70 NM long and 60 NM wide, and extend vertically from 5,000 feet AGL to FL250.

- Low-altitude training airspace—The airspace should be within 100 NM of Volk Field or a unit's home field, be 70 NM long and 60 NM wide, and extend vertically up to 5,000 feet AGL.

- Low-altitude navigation training airspace—MTRs should start within 50NM and end within 100 NM of Volk Field or a unit's home field and be oriented to offer maximum utility to prospective users, such as ending at an air-to-surface gunnery range.

- Air-to-surface gunnery ranges—MOA's should adjoin the range airspace and be oriented such that aircraft could fly multiple entries to a target from a point approximately 15 NM away and remain within training airspace.

Airspace that satisfies the above training requirements must also address FAA aeronautical, environmental, public interest, and operational criteria. The mandatory and desired criteria for these considerations are summarized in the following paragraphs.

Mandatory Criteria

The proposed airspace must comply with the criteria contained in FAA Handbook for Special Military Operations (7610.4H) for management, control, design, and safe separation procedures. The airspace must be as free as possible of airways, jet routes, terminal control areas, airport radar service areas, and airport traffic areas.

- The proposed restricted airspace for the Hardwood Range and the adjoining airspace must be available for use at least eight hours per day.
- The proposed MTRs must be available for at least eight hours per day.

Desired Criteria

- The proposed airspace should minimize overflight of populated, noise sensitive, and/or environmentally sensitive areas.
- The proposed airspace must be close enough to Volk Field to allow units to complete the maximum amount of training practicable.
- The proposed airspace must minimize costs through combined air-to-air and air-to-surface training.
- Each MTR should provide access to the Hardwood Range.
- Airspace adjacent to the Hardwood Range should permit multiple entries into R-6904A/B from multiple attack axes from a point 15 to 25 NM from the target area while remaining within the lateral and vertical boundaries of training airspace.
- MOAs should provide low, medium, and high-altitude entry to the Hardwood Range.

Airspace should be located and management controls established such that a sufficient amount of time can be spent in the area to accomplish the objectives of the assigned mission.

1.4.4 Summary of Special Operating Procedures and Flying Restrictions

The ANG routinely employs a variety of special operating procedures to decrease impacts on communities and other sensitive noise receptors (i.e., hospitals, schools, churches, etc.) that lie under or near MTRs or MOAs. These would apply to any alternative chosen for implementation. These procedures include:

- Avoidance of sensitive areas along an MTR by flying to one side of the centerline of the MTR or by increasing altitude over the sensitive area
- Avoidance of sensitive areas under a MOA by increasing altitude or through other measures.

The ANG maintains a minimum altitude over areas sensitive to low-altitude flight. These have been identified as listed below.

- Maintain a minimum 1,500-foot altitude above cliff or tree height at identified threatened and endangered species nest sites. Known areas populated by other potentially sensitive species are avoided by increasing separation distances determined appropriate through discussions with Federal and state agencies.

- Adhere to a 2,000-foot minimum AGL altitude whenever safety and operational parameters permit over designated Wild and Scenic Rivers and federally-designated Wilderness Areas.

The following are examples of FAA and military flying restrictions.

- Avoid structures or persons in isolated areas by 500 feet, maintaining a minimum altitude of 1,000 feet over populated areas.

- Avoid public-use airports displayed on aeronautical maps by at least 1,500 feet vertically when within 3 NM.

1.5 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

Under the National Environmental Policy Act (NEPA), Federal agencies are required to consider the environmental consequences of Proposed Actions using a systematic, interdisciplinary approach to ensure well-informed Federal decisions. The Council on Environmental Quality (CEQ) was established under NEPA to implement and oversee Federal policy in this process. To this end, CEQ has issued Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500-1508).

To comply with NEPA, the planning process for a Proposed Action includes a study of environmental issues related to the Proposed Action. The CEQ regulations specify that an Environmental Impact Statement (EIS) be prepared to:

- Serve as an action-forcing device to ensure the policies and goals of NEPA are integrated into actions of the Federal government.

- Provide full and fair discussion of significant environmental impacts.

- Inform decision makers and the public of the reasonable alternatives that would avoid or minimize adverse impacts.

This DOPAA is prepared in compliance with NEPA and the CEQ regulations for an EIS. The DOPAA is being sent to Federal, state, the public upon request, and local agencies with jurisdictions that could possibly be affected by the Proposed Action. This coordination is intended to fulfill requirements under the Intergovernmental Coordination Act and Executive Order 12372, which requires Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal.

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 OVERVIEW OF ALTERNATIVES CONSIDERED

This DOPAA for the proposed Hardwood Range Expansion and related airspace actions considers the following alternatives.

Proposed Action: This action would expand the land area for the Hardwood Range by a total of 7,137 acres and develop a new area for potential target locations, a drop zone, and an assault landing strip. It would also expand the vertical and lateral limits of the R-6904B airspace, increase the upper limit of R-6904A, establish six new MTRs south of the range that would encompass two ground tracks, and reassess the annual sortie utilization of one MOA and one MTR.

Alternatives to the Proposed Action: The following alternatives to the Proposed Action were considered for this analysis and evaluated in light of the narrowing criteria for airspace presented in Subsection 1.4.3:

- Establish a new air-to-surface gunnery range
- Use existing U.S. Army Range at Fort McCoy
- Close Hardwood Range and redirect units to other ranges
- Use existing MOAs and MTRs other than those contained in the Proposed Action
- Utilize electronic scoring of simulated weapons delivery
- Increase flight simulator training
- No-Action alternative.

2.2 DESCRIPTION OF PROPOSED ACTION

The Proposed Action would enlarge the Hardwood Range and its associated restricted airspace, establish six MTRs located along two corridors, and reassess the utilization in one MOA and one MTR. Figure 2-1 illustrates the airspace associated with the Proposed Action. In accordance with current policy, all routine ANG flights in MOAs and MTRs are restricted from flying below 500 feet AGL, except for periods of national emergency or special exercises as notified by NGB. The scheduling agency will be responsible to make public notification not less than two weeks beforehand when ANG flying operations are required below 500 feet. The notification would include a description of the training activity, expected flight levels, and the duration of the event. This policy does not apply to use of gunnery ranges. The Proposed Action is summarized on the following pages.

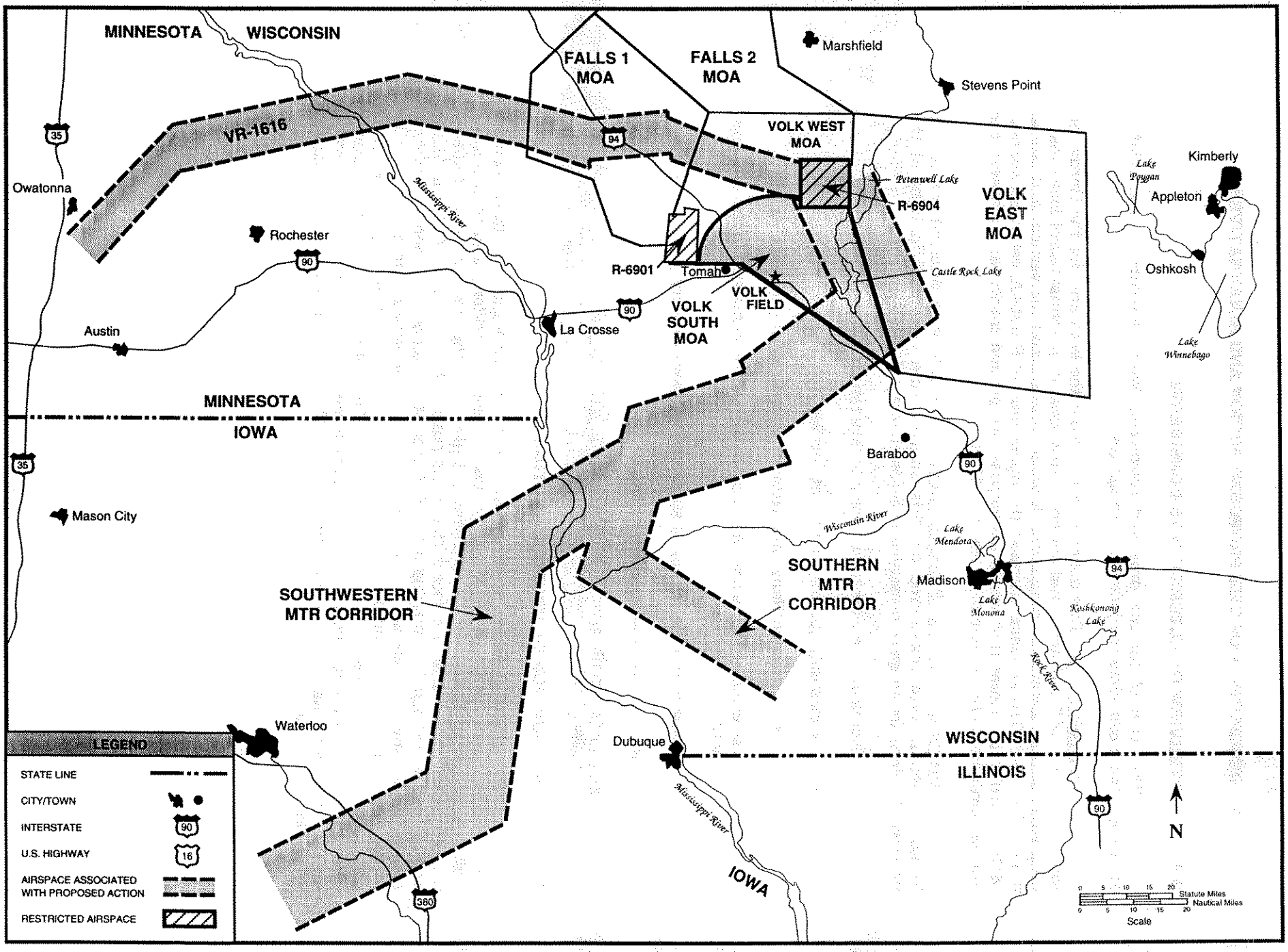

Figure 2-1. Airspace Associated with the Proposed Action

- **Modify Hardwood Air-to-Surface Gunnery Range.** This action would expand the land area to the north of the current boundaries by a total of 7,137 acres. In addition, a new area for potential target locations, a drop zone, and an assault landing strip would be developed. The new target area would provide opportunities for varied and more realistic air-to-ground training. Figure 2-2 illustrates these elements. The Range is centered approximately 20 statute miles north-northeast of Volk Field and 80 statute miles north-northwest of Madison, WI. The number of sorties flown annually would increase from 3,401 to 3,966.

- **Modify the Restricted Airspace Associated with the Hardwood Range.** This action would lower the bottom altitude and expand the lateral confines of Restricted Airspace 6904B (R-6904B) to coincide with the proposed land expansion (see Figure 2-3). It would also increase the maximum altitude of R-6904A and R-6904B continuously to FL250 and higher, as needed. Restricted airspace must be contiguous with any new range boundaries and extend vertically from ground level to ensure the safety of non-participating aircraft.

- **Establish XIRs 681 and 682; and XVRs 1685, 1686, 1687 and 1688.** These routes would have only two corridors but have six different designations to distinguish the direction of travel and type of applicable flight rules (i.e., instrument or visual flight rules). The proposed ground tracks would be oriented predominantly north-south, and extend between the Hardwood Range and points within approximately 200 NM south. The two ground tracks merge approximately 60 NM south of the range. The southwestern ground track would include XIR-681, XIR-682, XVR-1685, and XVR-1686 (see Figure 2-4). The southern ground track would include XVR-1687 and XVR-1688 (see Figure 2-5). The MTRs would either start or terminate at the southeastern boundary of R-6904. A total of approximately 2,151 flights would be flown annually along the six routes. This action is a stand-alone initiative and is independent of the range expansion.

- **Reassess Volk South MOA Utilization.** This action would increase the number of sorties flown annually from 185 to 1,340. The lateral and vertical boundaries would remain unchanged. The Volk South MOA is shown in Figure 2-6. This action is a stand-alone initiative and is independent of the range expansion.

- **Reassess VR-1616 Utilization.** VR-1616 is shown in Figure 2-7. The utilization would increase from 2,187 to 2,423 sorties annually. This action is a stand-alone initiative and is independent of the range expansion.

Informal coordination on the establishment of the southern and southwestern MTR corridors, discussed above, were conducted with the Federal Aviation Administration (FAA). As a part of these discussions, and in light of the airspace narrowing criteria presented in Subsection 1.4.3, alternative MTR corridors were determined to be unfeasible.

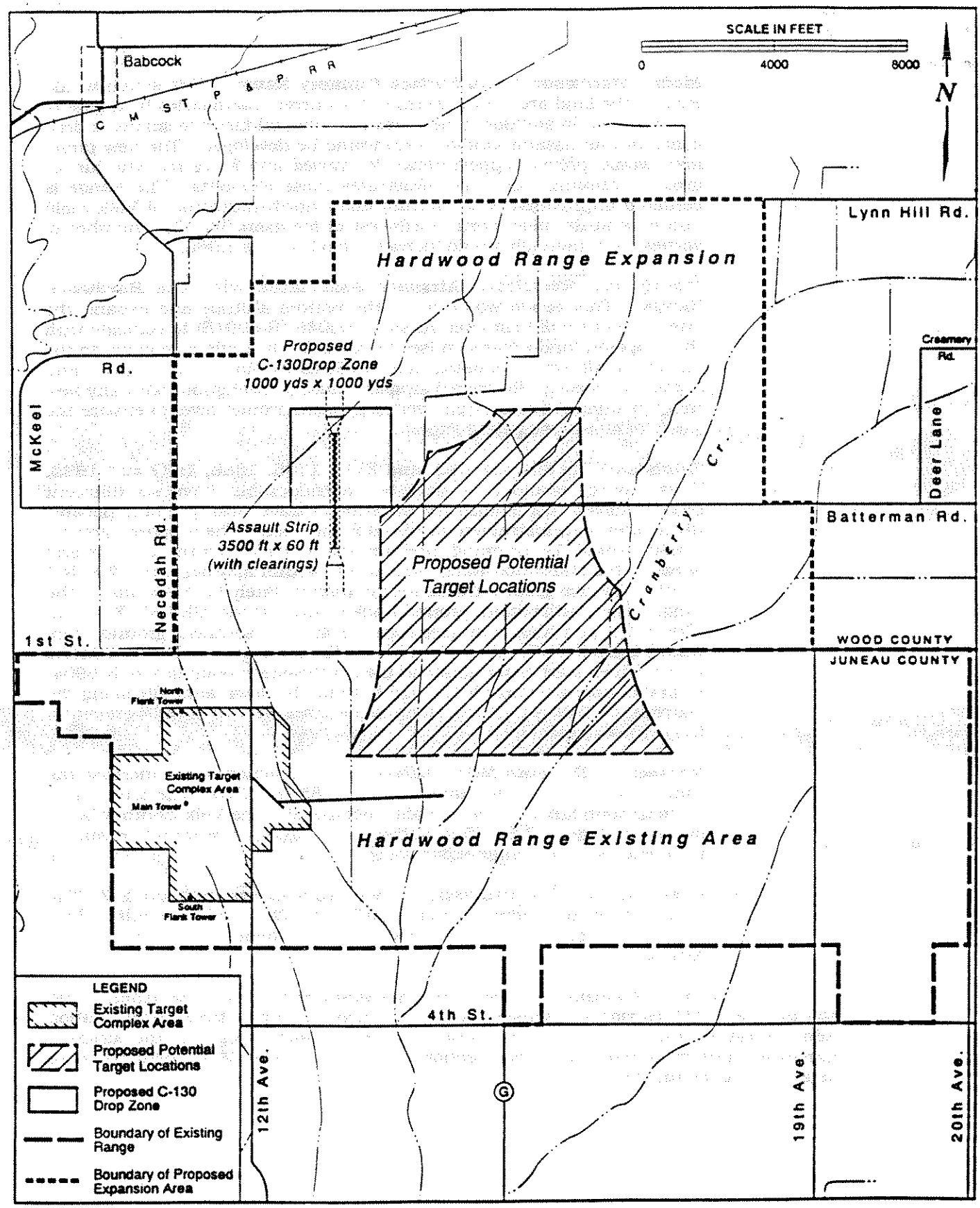

Figure 2-2. Configuration of the Hardwood Range Showing Details of Proposed Expansion

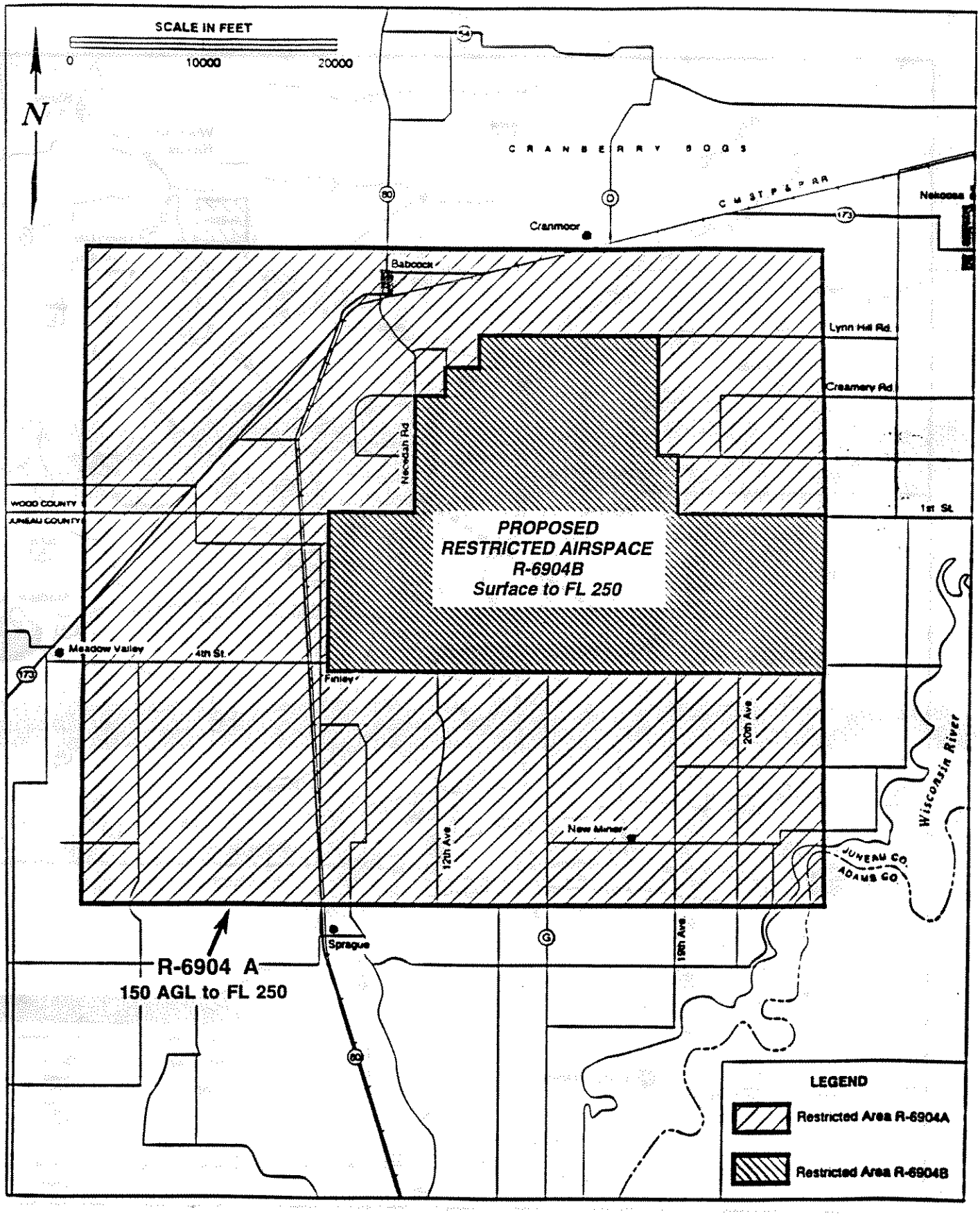

Figure 2-3. Modified Restricted Airspace R-6904 Under the Proposed Action

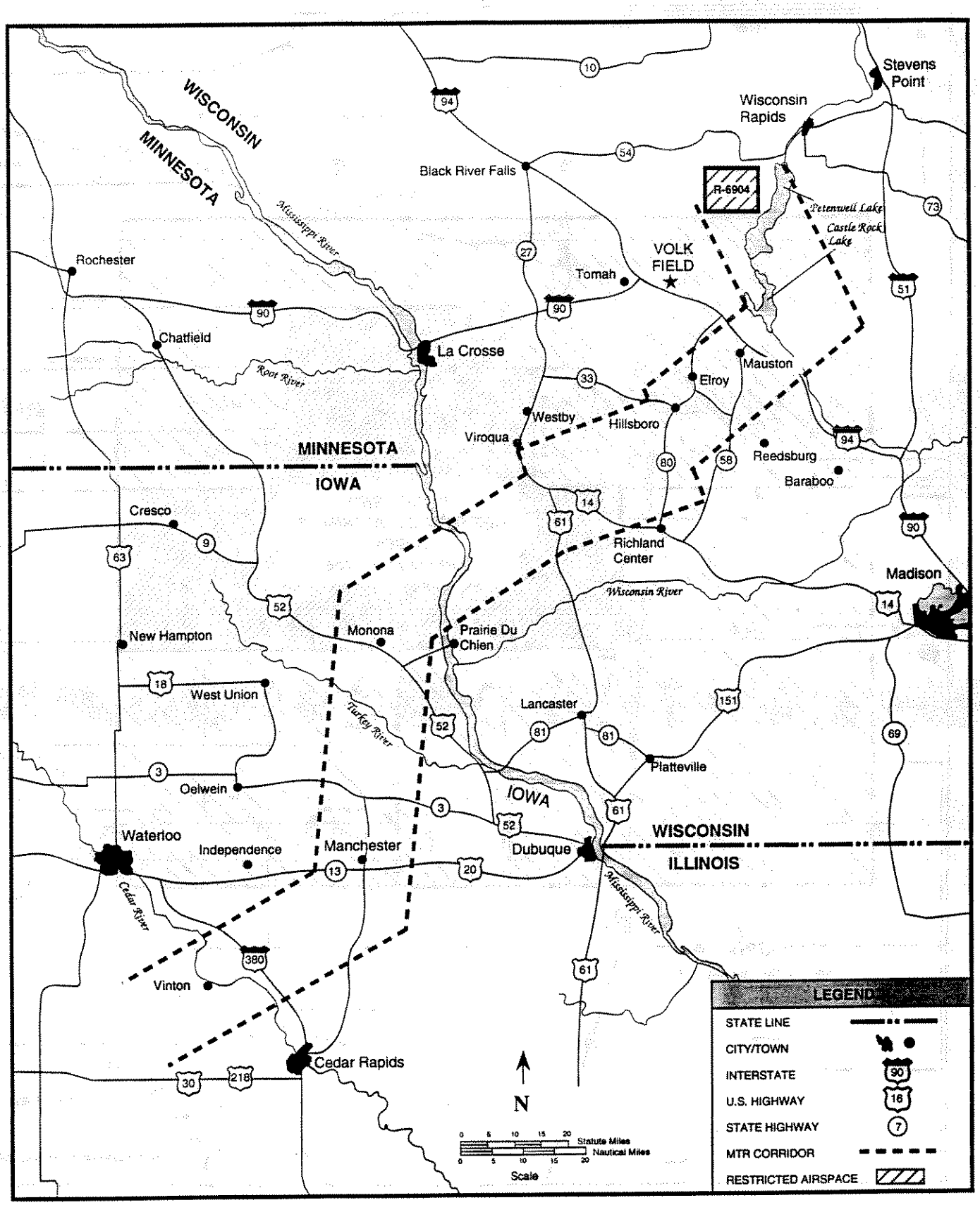

Figure 2-4. Southwestern Corridor for XIR-681, XIR-682, XVR-1685, and XVR-1686 Under the Proposed Action

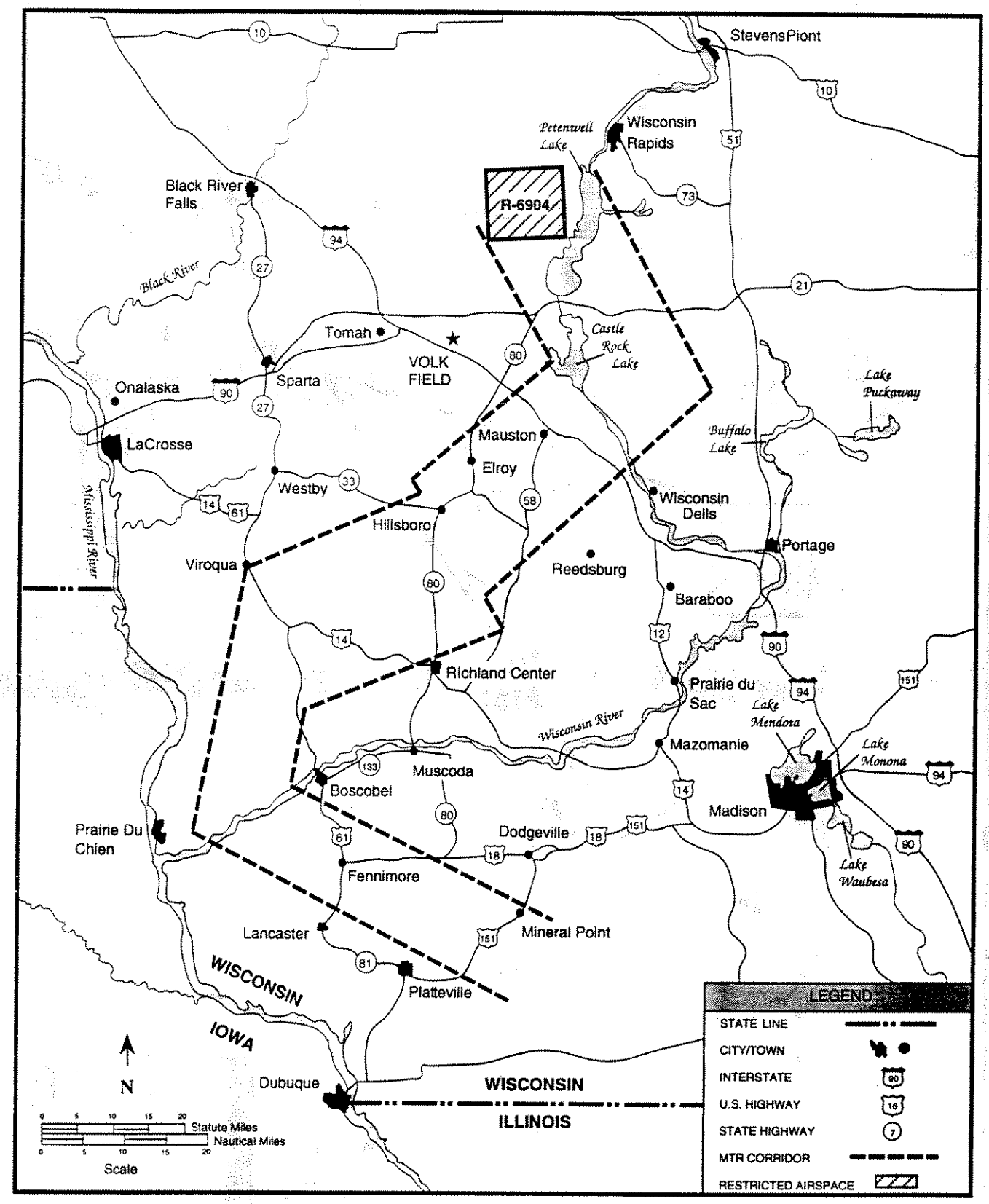

Figure 2-5. Southern Corridor for XVR-1687 and XVR-1688 Under the Proposed Action

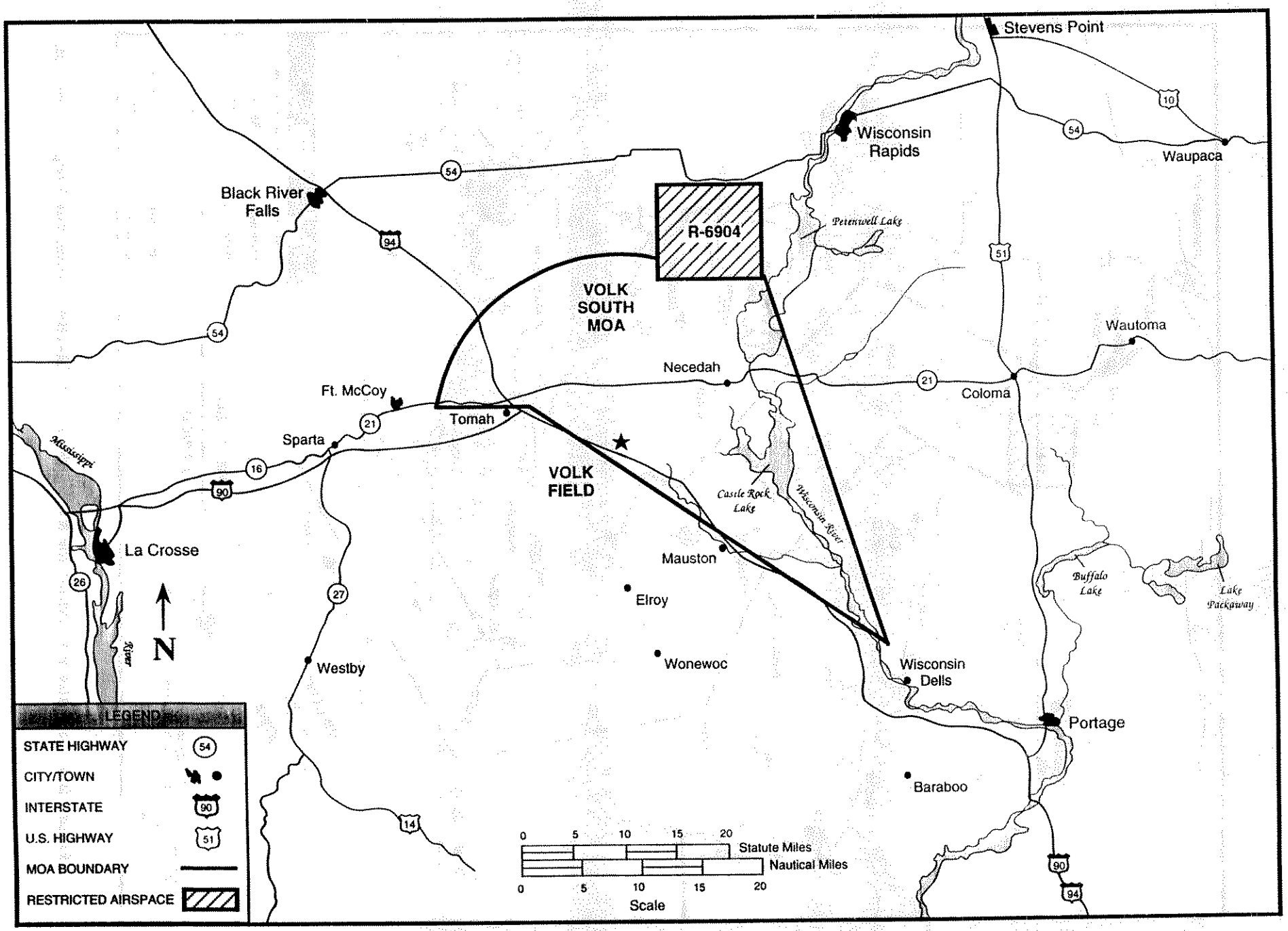

Figure 2-6. The Volk South MOA

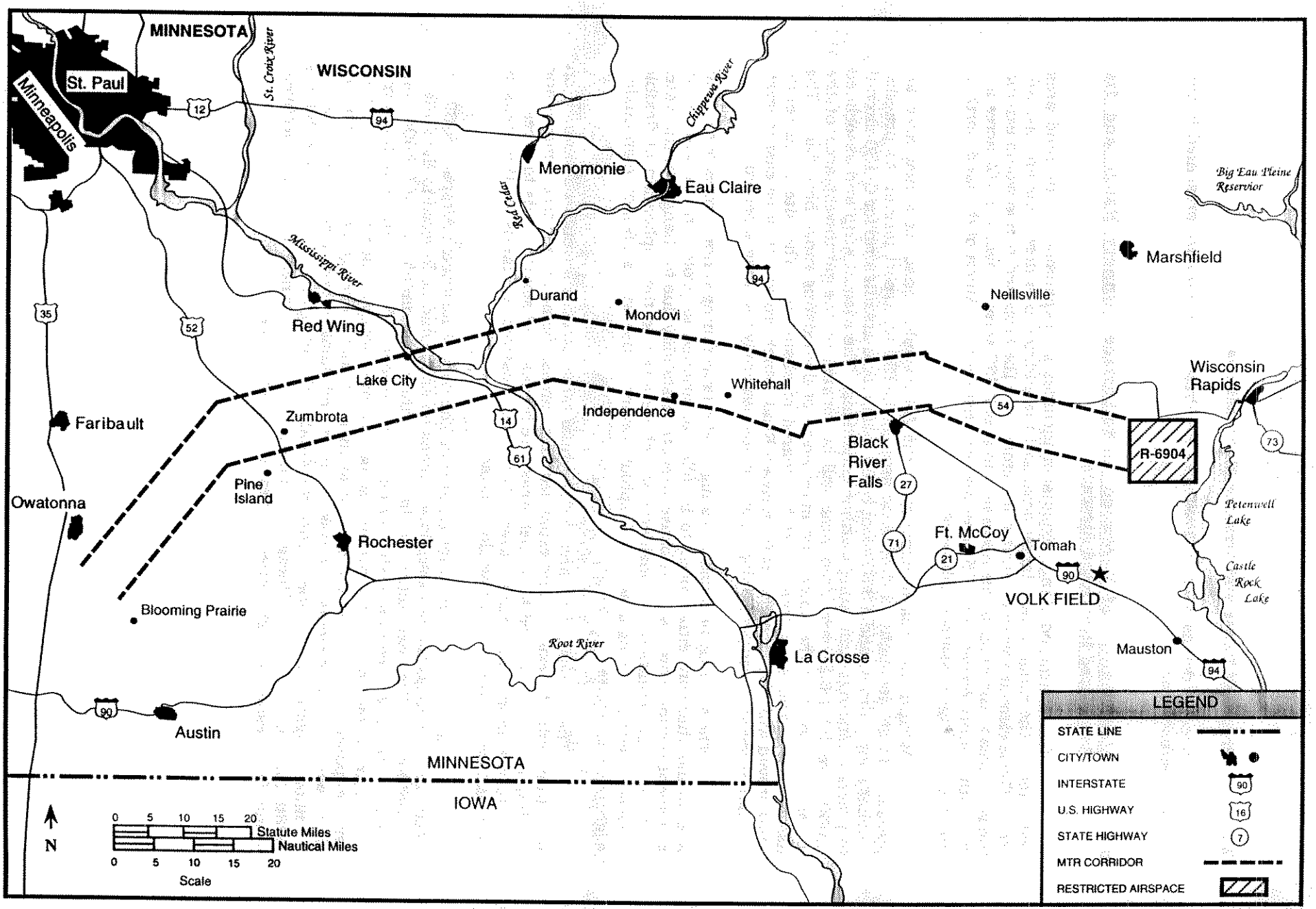

Figure 2-7. Existing VR-1616 Under the Proposed Action

2.2.1 Proposed Range and Airspace Modifications

Specific details of each element of the Proposed Action are presented in the following subsections.

2.2.1.1 Modification of Hardwood Air-to-Surface Gunnery Range and Its Associated Restricted Airspace

The Hardwood Range expansion includes an expansion of the land area dedicated to the range, a new target area, and the addition of a drop zone and assault strip. These elements were illustrated in Figure 2-2. The Proposed Action would expand the land area of the range to the north by a total of 7,137 acres, of which 6,162 acres are currently county-owned and 975 acres are privately-owned. Much of the land north of the existing range is sparsely inhabited.

Within the area of expansion, the ANG would construct a new area for potential target locations, a drop-zone area for C-130 transport aircraft to practice combat supply drops, and a 3,500-foot by 60-foot tactical assault strip for C-130 aircraft to practice landings simulating wartime conditions. The assault strip and associated 1,000-yard by 1,000-yard drop zone will be located in the northwest area of the expanded portion of the range, two miles north of the existing range boundary. The assault strip and drop zone must be cleared of obstacles. The site is currently unimproved with the exception of Battermam Road, which crosses the area east to west. The site is forested and gently sloping with grades generally less than 2 percent.

The site may be subject to a high water table during various times of the year and would therefore either need to be filled or drained to protect the assault strip pavement section from loss of subbase strength or stability due to changes in the water table or frost conditions. Consideration will be given to the application of flexible pavement sections using a two-inch asphalt surface course with a 15-inch high-quality aggregate base course.

The proposed new area for potential target locations would be situated on land from both the existing and expanded range areas. Some limited tree removal and grading would be required for target areas, fire breaks, and service roads to access the targets within the new target area. Whenever possible, wetlands in the areas of potential ground disturbance would be avoided.

As a result of the range expansion, the floor of Restricted Airspace R-6904B needs to encompass the proposed land expansion and would be lowered to the surface. In addition, the Proposed Action would increase the maximum altitude of R-6904A and R-6904B to FL 250 continuously and higher, as needed. The orientation of the target area would allow unrestricted run-in headings for most weapons deliveries. In addition, this proposed expansion would contain many flight tracks over government-controlled land, which would decrease the risk of injury and damage from dropped objects. In addition to fighter and bomber flights, the 440th Airlift Wing (AW) in Milwaukee, WI; the 928th Airlift Group (AG) in Chicago, IL; and the 133 AW in Minneapolis, MN; collectively, would fly an estimated 228 sorties per year in the target area.

The restricted airspace (R-6904A/B) and range would be used between 7:00 AM and 10:00 PM. The approximate geographic coordinates of R-6904A and R-6904B would be as follows:

R-6904A (unchanged):

Beginning at	44°18.0'N 89°59.0'W
to	44°10.0'N 89°59.0'W
to	44°10.0'N 90°11.0'W
to	44°18.0'N 90°11.0'W
to	point of beginning excluding R-6904B

R-6904B:

Beginning at	44°13.3'N 90°07.2'W
to	44°14.9'N 90°07.2'W
to	44°14.9'N 90°06.0'W
to	44°16.7'N 90°06.1'W
to	44°16.8'N 90°05.4'W
to	44°17.1'N 90°05.4'W
to	44°17.1'N 90°04.8'W
to	44°17.4'N 90°04.8'W
to	44°17.4'N 90°01.4'W
to	44°15.9'N 90°01.4'W
to	44°15.9'N 90°01.1'W
to	44°14.9'N 90°01.0'W
to	44°14.9'N 89°59.0'W
to	44°13.3'N 89°59.0'W
to	point of beginning.

2.2.1.2 Establishment of XIR-681

This route would be in the southwestern ground track MTR corridor and begin approximately 26 NM west of Cedar Rapids, IA. The route would proceed in a north-northeast direction, cross the Mississippi River, and terminate at the southeast corner of R-6904A. The route would extend vertically from 300 feet AGL to 5,000 feet MSL, be used for visual or instrument navigation training, and be scheduled for use predominantly between the hours of sunrise and sunset. Table 2-1 describes the proposed route.

Table 2-1. Proposed XIR-681

ALTITUDE DATA	*POINT*	*LATITUDE/LONGITUDE*	*ROUTE WIDTH (NM) (LEFT/RIGHT Of CENTERLINE)*	
5,000 feet MSL	*A*	*42°01.0'N 92°13.0'W*		
300 feet AGL to 5,000 feet MSL	*B*	*42°18.0'N 91°33.0'W*	*A to B*	*10 Left/5 Right*
300 feet AGL to 5,000 feet MSL	*C*	*42°37.0'N 91°31.0'W*	*B to C*	*5 Left/10 Right*
300 feet AGL to 5,000 feet MSL	*D*	*43°09.0'N 91°26.0'W*	*C to D*	*5 Left/10 Right*
300 feet AGL to 5,000 feet MSL	*E*	*43°26.0'N 90°49.0'W*	*D to E*	*4 Left/10 Right*
300 feet AGL to 5,000 feet MSL	*F*	*43°34.0'N 90°18.0'W*	*E to F*	*8 Left/10 Right*
300 feet AGL to 5,000 feet MSL	*G*	*43°49.0'N 89°50.0'W*	*F to G*	*10 Left/5 Right*
300 feet AGL to 5,000 feet MSL	*H*	*44°03.0'N 89°59.0'W*	*G to H*	*5 Left/10 Right*
300 feet AGL to 5,000 feet MSL	*I*	*44°10.0'N 90°04.0'W*	*H to I*	*5 Left/10 Right*

NOTE: Current ANG policy is to not fly below 500 feet AGL.

2.2.1.3 Establishment of XIR-682

This route would be in the southwestern ground track MTR corridor and would follow the reverse of XIR-681, terminating approximately 26 NM west of Cedar Rapids, IA. The route would extend vertically from 300 feet AGL to 5,000 feet MSL, be used for visual navigation training, and be scheduled for use predominantly between the hours of sunrise and sunset. Table 2-2 describes the proposed route.

Table 2-2. Proposed XIR-682

ALTITUDE DATA	POINT	LATITUDE/LONGITUDE	ROUTE WIDTH (NM) (LEFT/RIGHT Of CENTERLINE)	
5,000 feet MSL	A	44°10.0'N 90°04.0'W		
300 feet AGL to 5,000 feet MSL	B	44°03.0'N 89°59.0'W	A to B	10 Left/5 Right
300 feet AGL to 5,000 feet MSL	C	43°49.0'N 89°50.0'W	B to C	10 Left/5 Right
300 feet AGL to 5,000 feet MSL	D	43°34.0'N 90°18.0'W	C to D	5 Left/10 Right
300 feet AGL to 5,000 feet MSL	E	43°26.0'N 90°49.0'W	D to E	10 Left/8 Right
300 feet AGL to 5,000 feet MSL	F	43°09.0'N 91°26.0'W	E to F	10 Left/4 Right
300 feet AGL to 5,000 feet MSL	G	42°37.0'N 91°31.0'W	F to G	10 Left/5 Right
300 feet AGL to 5,000 feet MSL	H	42°18.0'N 91°33.0'W	G to H	10 Left/5 Right
300 feet AGL to 5,000 feet MSL	I	42°01.0'N 92°13.0'W	H to I	5 Left/10 Right

NOTE: Current ANG policy is to not fly below 500 feet AGL.

2.2.1.4 Establishment of XVR-1685

This route would be in the southwestern ground track MTR corridor and would follow the same ground track as XIR-681, terminating in the southeastern corner of R-6904B. The route would extend vertically from 300 feet AGL to 1,500 feet AGL, be used for visual navigation training, and be scheduled for use predominantly between the hours of sunrise and sunset. Table 2-3 describes the proposed route.

Table 2-3. Proposed XVR-1685

ALTITUDE DATA	POINT	LATITUDE/LONGITUDE	ROUTE WIDTH (NM) (LEFT/RIGHT Of CENTERLINE)	
1,500 feet AGL	A	42°01.0'N 92°13.0'W		
300 feet AGL to 1,500 feet AGL	B	42°18.0'N 91°33.0'W	A to B	10 Left/5 Right
300 feet AGL to 1,500 feet AGL	C	42°37.0'N 91°31.0'W	B to C	5 Left/10 Right
300 feet AGL to 1,500 feet AGL	D	43°09.0'N 91°26.0'W	C to D	5 Left/10 Right
300 feet AGL to 1,500 feet AGL	E	43°26.0'N 90°49.0'W	D to E	4 Left/10 Right
300 feet AGL to 1,500 feet AGL	F	43°34.0'N 90°18.0'W	E to F	8 Left/10 Right
300 feet AGL to 1,500 feet AGL	G	43°49.0'N 89°50.0'W	F to G	10 Left/5 Right
300 feet AGL to 1,500 feet AGL	H	44°03.0'N 89°59.0'W	G to H	5 Left/10 Right
300 feet AGL to 1,500 feet AGL	I	44°14.0'N 90°06.0'W	H to I	5 Left/10 Right

NOTE: Current ANG policy is to not fly below 500 feet AGL.

2.2.1.5 Establishment of XVR-1686

This route would be in the southwestern ground track MTR corridor and begin in the southeast corner of R-6904B. It would then follow the same ground track as XIR-682 and terminate approximately 26 NM west of Cedar Rapids, IA. The route would extend vertically from 300 feet AGL to 1,500 feet AGL, be used for visual navigation training, and be scheduled for use predominantly between the hours of sunrise and sunset. Table 2-4 describes the proposed route.

Table 2-4. Proposed XVR-1686

ALTITUDE DATA	POINT	LATITUDE/LONGITUDE	ROUTE WIDTH (NM) (LEFT/RIGHT Of CENTERLINE)	
1,500 feet AGL	A	44°14.0'N 90°06.0'W		
300 feet AGL to 1,500 feet AGL	B	44°03.0'N 89°59.0'W	A to B	10 Left/5 Right
300 feet AGL to 1,500 feet AGL	C	43°49.0'N 89°50.0'W	B to C	10 Left/5 Right
300 feet AGL to 1,500 feet AGL	D	43°34.0'N 90°18.0'W	C to D	5 Left/10 Right
300 feet AGL to 1,500 feet AGL	E	43°26.0'N 90°49.0'W	D to E	10 Left/8 Right
300 feet AGL to 1,500 feet AGL	F	43°09.0'N 91°26.0'W	E to F	10 Left/4 Right
300 feet AGL to 1,500 feet AGL	G	42°37.0'N 91°31.0'W	F to G	10 Left/5 Right
300 feet AGL to 1,500 feet AGL	H	42°18.0'N 91°33.0'W	G to H	10 Left/5 Right
300 feet AGL to 1,500 feet AGL	I	42°01.0'N 92°13.0'W	H to I	5 Left/10 Right

NOTE: Current ANG policy is to not fly below 500 feet AGL.

2.2.1.6 Establishment of XVR-1687

This route would be in the southern ground track MTR corridor and would begin approximately 42 NM southwest of Madison, WI. It would proceed northwest toward the Mississippi River, then northeast to the southeastern portion of R-6904B. The route would extend vertically from 300 feet AGL to 1,500 feet AGL, be used for visual navigation training, and be scheduled for use predominantly between the hours of sunrise and sunset. Table 2-5 describes the proposed route.

Table 2-5. Proposed XVR-1687

ALTITUDE DATA	POINT	LATITUDE/LONGITUDE	ROUTE WIDTH (NM) (LEFT/RIGHT Of CENTERLINE)	
1,500 feet AGL	A	42°46.0'N 90°10.0'W		
300 feet AGL to 1,500 feet AGL	B	43°05.0'N 90°54.0'W	A to B	5 Left/5 Right
300 feet AGL to 1,500 feet AGL	C	43°26.0'N 90°49.0'W	B to C	5 Left/5 Right
300 feet AGL to 1,500 feet AGL	D	43°34.0'N 90°18.0'W	C to D	8 Left/10 Right
300 feet AGL to 1,500 feet AGL	E	43°49.0'N 89°50.0'W	D to E	10 Left/5 Right
300 feet AGL to 1,500 feet AGL	F	44°03.0'N 89°59.0'W	E to F	5 Left/10 Right
300 feet AGL to 1,500 feet AGL	G	44°14.0'N 90°06.0'W	F to G	5 Left/10 Right

NOTE: Current ANG policy is to not fly below 500 feet AGL.

2.2.1.7 Establishment of XVR-1688

This route would be in the southern ground track MTR corridor and would begin in the southeastern portion of R-6904B. It would then follow the reverse of XVR-1687 and terminate approximately 42 NM southwest of Madison, WI. The route would extend vertically from 300 feet AGL to 1,500 feet AGL, be used for visual navigation training, and be scheduled for use predominantly between the hours of sunrise and sunset. Table 2-6 describes the proposed route.

Table 2-6. Proposed XVR-1688

ALTITUDE DATA	*POINT*	*LATITUDE/LONGITUDE*	*ROUTE WIDTH (NM) (LEFT/RIGHT Of CENTERLINE)*	
1,500 feet AGL	*A*	*44°14.0'N 90°06.0'W*		
300 feet AGL to 1,500 feet AGL	*B*	*44°03.0'N 89°59.0'W*	*A to B*	*10 Left/5 Right*
300 feet AGL to 1,500 feet AGL	*C*	*43°49.0'N 89°50.0'W*	*B to C*	*10 Left/5 Right*
300 feet AGL to 1,500 feet AGL	*D*	*43°34.0'N 90°18.0'W*	*C to D*	*5 Left/10 Right*
300 feet AGL to 1,500 feet AGL	*E*	*43°26.0'N 90°49.0'W*	*D to E*	*10 Left/8 Right*
300 feet AGL to 1,500 feet AGL	*F*	*43°05.0'N 90°54.0'W*	*E to F*	*5 Left/5 Right*
300 feet AGL to 1,500 feet AGL	*G*	*42°46.0'N 90°10.0'W*	*F to G*	*5 Left/5 Right*

NOTE: Current ANG policy is to not fly below 500 feet AGL.

2.2.1.8 Reassessment of Volk South MOA

No modifications to the lateral and vertical dimensions of the MOA would be made. However, this action would increase the number of sorties flown annually from 185 to 1,340. Specific utilization data are presented in Subsection 2.2.2.8. All missions would be flown at subsonic airspeeds between 250 and 550 KIAS (285 to 625 MPH). The area would be used predominantly between the hours of sunrise to sunset.

2.2.1.9 Reassessment of VR-1616

No modification to the lateral or vertical dimensions of this MTR would be made. However, this action would increase the number of sorties flown annually from 2,187 to 2,423. Specific utilization data are presented in Subsection 2.2.2.9.

2.2.2 Airspace Utilization

The following subsections briefly describe each airspace component of the Proposed Action. Tables in each subsection depict current and proposed annual military training flights (sorties) for each airspace component. This utilization, displayed in the tables and shown as sorties, represents the number and type of aircraft anticipated in each airspace. **An aircraft typically uses several MOAs and/or MTRs on a single training flight. For example, a single aircraft may fly a single training flight through VR-1616, the range, the Volk South MOA, and XVR-1686. This one sortie would be counted in each of the sortie totals for each of these airspaces. Therefore, the totals shown in the tables for each airspace component cannot be added together to produce a total sortie count for the overall Proposed Action, as this would over-count the sortie totals.** Sorties are compiled in this manner, by airspace, because analyses are quantified by each individual piece of airspace based upon the total number of sorties conducted within that airspace.

2.2.2.1 Hardwood Air-to-Surface Gunnery Range Restricted Airspace

The number of sorties flown annually on the range would increase from 3,401 to 3,966. The number of sorties in the Hardwood Range airspace, by type aircraft, are shown in Table 2-7.

Table 2-7. Current and Proposed Annual Utilization on the Hardwood Range

UNIT	*TYPE AIRCRAFT*	*SORTIES/YEAR (CURRENT[1])*	*SORTIES/YEAR (PROPOSED)*
Multiple	*F-16*	*2421*	*3024*
Multiple	*A-10*	*422*	*261*
416 FS	*CF-18*	*7*	*96*
4 FW	*F-15E*	*48*	*60*
37 BS	*B-1*	*4*	*50*
366 WG	*B-52/F-16/F-15E*	*230*	*48*
Multiple	*B-52*	*133*	*40*
57 TG	*F-15*	*50*	*12*
Multiple	*Other[2]*	*86*	*375*
TOTALS		*3401*	*3966*

NOTES:
1. *Current use information is for the period June 1, 1993 through May 31, 1994.*
2. *"Other" includes A-6, AH-1, B-2, C-130, C-580, F-18, F-111, F-117, HH-1, RF-4, and UH-1 aircraft.*

2.2.2.2 XIR-681

This action would establish a new MTR south of the Hardwood Range designated for IFR flight. Table 2-8 depicts the number of sorties in the airspace projected annually along the route and the type aircraft.

Table 2-8. Proposed Annual Utilization for XIR-681

UNIT	AIRCRAFT TYPE	SORTIES/YEAR
Multiple	F-16	190
Multiple	Other[1]	112
TOTAL		302

NOTE:
1. "Other" includes A-6, AH-1, B-2, C-130, C-580, F-18, F-111, F-117, HH-1, RF-4, and UH-1 aircraft.

2.2.2.3 XIR-682

This action would establish a new MTR south of the Hardwood Range designated for IFR flight. Table 2-9 depicts the number of sorties in the airspace projected annually along the route and the type aircraft.

Table 2-9. Proposed Annual Utilization for XIR-682

UNIT	AIRCRAFT TYPE	SORTIES/YEAR
Multiple	F-16	42
5 BW	B-52	12
4 FW	F-15E	12
Multiple	Other[1]	74
TOTAL		140

NOTE:
1. "Other" includes A-6, AH-1, B-2, C-130, C-580, F-18, F-111, F-117, HH-1, RF-4, and UH-1 aircraft.

2.2.2.4 XVR-1685

This action would establish a new MTR south of Hardwood Range designated for VFR flight. Table 2-10 depicts the number of sorties in the airspace projected annually along the route and the type aircraft.

Table 2-10. Proposed Annual Utilization on XVR-1685

UNIT	AIRCRAFT TYPE	SORTIES/YEAR
Multiple	F-16	766[2]
Multiple	Other[1]	82
TOTAL		848

NOTES:
1. "Other" includes A-6, AH-1, B-2, C-130, C-580, F-18, F-111, F-117, HH-1, RF-4, and UH-1 aircraft.
2. 746 day, 20 night.

2.2.2.5 XVR-1686

This action would establish a new MTR south of the Hardwood Range designated for VFR flight. Table 2-11 depicts the number of sorties in the airspace projected annually along the route and the type aircraft.

Table 2-11. Proposed Annual Utilization for XVR-1686

UNIT	AIRCRAFT TYPE	SORTIES/YEAR
Multiple	F-16	213
Multiple	Other[1]	82
TOTAL		295

NOTE:
1. "Other" includes A-6, AH-1, B-2, C-130, C-580, F-18, F-111, F-117, HH-1, RF-4, and UH-1 aircraft.

2.2.2.6 XVR-1687

This action would establish a new MTR south of the Hardwood Range designated for VFR flight. Table 2-12 depicts the number of sorties in the airspace projected annually along the route and the type aircraft.

Table 2-12. Proposed Annual Utilization for XVR-1687

UNIT	AIRCRAFT TYPE	SORTIES/YEAR
Multiple	F-16	336[2]
Multiple	Other[1]	76
TOTAL		418

NOTES:
1. "Other" includes A-6, AH-1, B-2, C-130, C-580, F-18, F-111, F-117, HH-1, RF-4, and UH-1 aircraft.
2. 316 day, 20 night.

2.2.2.7 XVR-1688

This action would establish a new MTR south of the Hardwood Range designated for VFR flight. Table 2-13 depicts the number of sorties in the airspace projected annually along the route and the type of aircraft.

Table 2-13. Proposed Annual Utilization for VXR-1688

UNIT	AIRCRAFT TYPE	SORTIES/YEAR
Multiple	F-16	66
Multiple	Other[1]	82
TOTAL		148

NOTE:
1. "Other" includes A-6, AH-1, B-2, C-130, C-580, F-18, F-111, F-117, HH-1, RF-4, and UH-1 aircraft.

2.2.2.8 Volk South MOA

This action would increase the total number of sorties in the airspace annually in the Volk South MOA. The lateral and vertical boundaries would remain unchanged. Table 2-14 depicts the current and projected number of sorties in the airspace by type aircraft in the Volk South MOA.

Table 2-14. Current and Proposed Annual Utilization in the Volk South MOA

UNIT	AIRCRAFT TYPE	SORTIES/YEAR (CURRENT)	SORTIES/YEAR (PROPOSED)
Multiple	F-16	152	1286[1]
366 WG	B-52/F-16/F-15E	8	36
27 FW	F-111	25	18
TOTALS		185	1340

NOTE:
1. 1266 day, 20 night.

2.2.2.9 VR-1616

The annual number of sorties in the airspace would increase from 2,187 to 2,423 as shown in Table 2-15.

Table 2-15. Current and Proposed Annual Utilization on VR-1616

UNIT	AIRCRAFT TYPE	SORTIES/YEAR (CURRENT[1])	SORTIES/YEAR (PROPOSED)
Multiple	F-16	1830	2222[3]
366 W	B-52/F-15E/F-16	72	48
5 BW	B-52	134	40
4 FW	F-15E	28	40
27 FW	F-111	31	36
VA-85	A-6	25	26
Multiple	F-15	28	0
Multiple	Other[2]	39	11
TOTALS		2187	2423

NOTES:
1. Current use information is for the period June 1, 1993 through May 31, 1994.
2. "Other" includes A-6, AH-1, B-2, C-130, C-580, F-18, F-111, F-117, HH-1, RF-4, and UH-1 aircraft.
3. 2162 day, 60 night.

2.2.2.10 Cumulative Proposed Utilization in the MTR Corridors

This subsection addresses the cumulative totals for proposed sorties to be flown in the southern and southwestern MTR corridors and the shared area of these corridors. Six MTRs would be routed on these corridors. Their proposed cumulative totals are shown in Table 2-16.

Table 2-16. Cumulative Proposed Utilization on the MTR Corridors

MTR CORRIDOR	*MTRs INCLUDED*	*SORTIES*
Southern	*XVR-1687, XVR-1688*	*566*
Southwestern	*XIR-681, XIR-682, XVR-1685, XVR-1686*	*1,585*
Common Area	*All of the above*	*2,151*[1]

NOTE:
1. 100 Night.

2.3 ALTERNATIVES TO THE PROPOSED ACTION

The following subsections present alternatives to the Proposed Action that were considered in light of the narrowing criteria described in Subsection 1.4.3. Information on the applicability of these alternatives to meeting ANG training requirements is also presented.

2.3.1 Establish a New Air-to-Surface Gunnery Range

The ANGRC examined the feasibility of establishing a new range at some other location within an operationally usable distance for each unit currently using the Hardwood Range. This examination concluded that establishing a new range would be cost prohibitive and potentially undesirable from an environmental standpoint. Therefore, this is not a viable alternative.

2.3.2 Use Existing U.S. Army Range at Fort McCoy

The Fort McCoy range complex consists of the Fort McCoy Army Airfield, the Young Assault Strip, and an artillery range. The complex is located approximately 20 miles west of Volk Field and approximately 32 miles southwest of the Hardwood Range. The restricted airspace associated with the Fort McCoy Range is R-6901.

Fort McCoy Army Airfield has two runways. One runway is 4,200 feet long, of which 2,800 feet is 100 feet wide and the remainder is 50 feet wide. The second runway is 4,700 feet long and 100 feet wide for its entire length.

The Young Assault Strip is unlit, 3,500 feet long and 60 feet wide with 300-feet overruns at each end. The surface is compressed gravel. Designed and constructed to replicate an unimproved air landing field at a third world country, it is capable of handling C-130 aircraft. The assault strip can also be used as a drop zone for airborne operations. However, the assault strip is inaccessible during periods when training is occurring using live ammunition. U.S. Army units have priority over all other units requesting to use the range. According to U.S. Army use schedules, the assault

strip would not be accessible enough to meet projected requirements. Therefore, an assault strip would still be needed on the Hardwood Range.

The artillery range is used primarily for ground-to-ground artillery training; however, some air-to-surface training is conducted. The range is 3.5 miles by 4 miles on the northern end and tapers to 1.5 miles on the southern end. The U.S. Army schedules and manages the airspace and range utilization. The U.S. Army is the primary user and utilizes the range for day and night armor, artillery, and armed helicopter training.

While the range complex is well suited for U.S. Army artillery training, it has several limitations that preclude conducting viable tactical aircraft training. Experience has shown that realistic training for tactical aircraft requires a land area at least 7 miles by 5 miles for target dispersal. In addition to the size limitation, the Fort McCoy range operating procedures require a Forward Air Controller to direct all tactical aircraft training. Approximately 80 percent of the tactical training that would be conducted on Hardwood Range does not require a Forward Air Controller. Therefore, only 20 percent of the required tactical training could be conducted on the Fort McCoy range even if the range were large enough to conduct viable training. A third limitation is the absence of equipment such as control towers and ordnance spotting/scoring devices to score weapons delivery accuracy. Future range improvements do not include any of this equipment. If the Fort McCoy range was transferred to ANG control, new targets developed, and towers and support facilities constructed, then the range could be used for some of the training planned for the Hardwood Range. However, future U.S. Army plans for utilization and facility upgrades appear to make a transfer very unlikely. Therefore, this is not considered a viable alternative.

2.3.3 Close Hardwood Range and Redirect Units to Other Ranges

The ANGRC examined the feasibility of having current and projected military air-to-surface gunnery training accomplished on air-to-surface ranges other than the Hardwood Range. Although some other ANG ranges are closer to Hardwood Range for some using units (see Table 2-17 and Figure 2-8), Volk Field and the Hardwood Range offer a unique opportunity for air-to-surface and instrumented air-to-air training at one location. Combined air-to-air and air-to-surface training, which is available at Hardwood Range, is available only at a select few locations throughout the United States, each of which is well outside a usable operational distance. Requiring units to undertake air-to-surface training and air-to-air training at different locations would substantially increase the cost of training for some units. Increased costs are incurred because of additional fuel requirements and flying time necessary to reach more distant training ranges. Closing Hardwood Range also would involve costs associated with decommissioning the range. This alternative did not satisfy any of the desired or mandatory operational criteria specified in Subsection 1.4.3. Therefore, this is not a viable alternative.

Table 2-17. ANG Air-to-Surface Gunnery Ranges Within 300 NM Of Primary Using Unit Locations

UNIT/LOCATION	RANGE	DISTANCE
114 FG/Sioux Falls, SD	Hardwood	290 NM
	Smoky Hill	297 NM
128 FW/Madison, WI	Atterbury	274 NM
	Grayling	230 NM
	Hardwood	67 NM
132 FW/Des Moines, IA	Cannon	242 NM
	Hardwood	225 NM
	Smoky Hill	256 NM
183 FG/Springfield, IL	Atterbury	170 NM
	Cannon	178 NM
	Hardwood	264 NM
	Jefferson Proving Ground	204 NM
185 FG/Sioux City, IA	Hardwood	296 NM
	Smoky Hill	220 NM
Hardwood Range	Grayling	245 NM

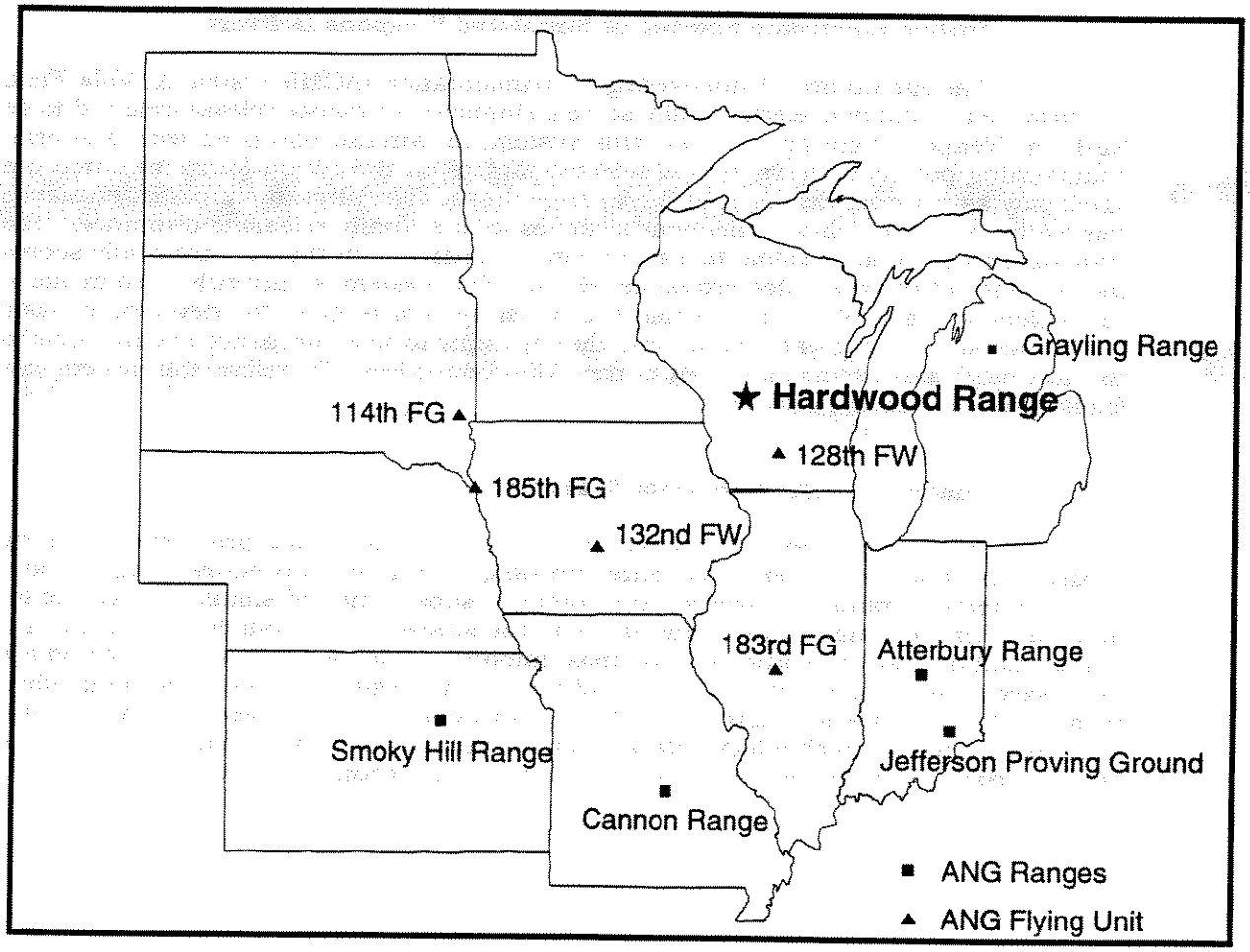

Figure 2-8. Primary Using Units of the Hardwood Range and Other Range Options

2.3.3 Use or Modify Existing MOAs And MTRs Other Than Those Contained in The Proposed Action

The use of other existing airspace as alternatives to the Proposed Action were reviewed to determine the adequacy to meet training requirements. However, for the reasons indicated below, these airspaces were not utilized.

- **Use Falls 1 and Falls 2 MOAs.** The Falls 1 MOA is centered approximately 50 NM northwest and the Falls 2 MOA is centered approximately 35 NM north-northwest of the Hardwood Range. Neither MOA adjoins R-6904A/B airspace. Therefore, neither MOA would help increase the attack axes onto the range, which eliminates them as a viable alternative.

- **Lower Volk East MOA.** The Volk East MOA adjoins R-6904A/B airspace to the east. The floor of the MOA is 8,000 feet MSL. The FAA will not lower the floor of the MOA because of the underlying airways. Therefore, because a low-altitude entry to the Hardwood Range could not be accomplished from this MOA, it was eliminated as a viable alternative.

- **Use VR-1650.** The start point for VR-1650 is approximately 40 NM northwest of the Hardwood Range. The route proceeds northeast before turning south and terminating on the Hardwood Range. For units from the south, VR-1650 would increase traveling distances to the range.

2.3.4 Utilize Electronic Scoring of Simulated Weapons Delivery

The Air Combat Maneuvering Instrumentation (ACMI) system at Volk Field can provide the ability to electronically score a simulated ordnance release (referred to as No-Drop Weapons Scoring). To use this system, an aircraft equipped with a special transmitting pod maneuvers toward selected targets on Hardwood Range in much the same way as it would during actual ordnance drops. The aircraft simulates ordnance release by using the same armament switches as if actually releasing ordnance. The transmitter pod sends a signal to a processing location which then electronically scores the accuracy of the simulated ordnance release. This system is currently used by some units deployed to Volk Field. While the ACMI system is good for developing basic proficiency skills, it does not yet possess the capability to score ordnance release skills to the accuracy parameters required by current USAF directives. Therefore, this system was eliminated from further consideration.

2.3.5 Increase Flight Simulator Training

Flight simulators are already included in the aircrew's proficiency training program, such as instrument procedures training, emergency procedures training, and limited intercept training. However, the complete substitution of simulator training for all flight training is not a viable alternative to the airspace proposals in this document. Actual military training sorties are the most important part of a pilot's training and are necessary to accomplish those portions of the training which cannot be accomplished through the use of a simulator. The ANG continuously studies ways to incorporate emerging simulator technology into aircrew training programs to reduce the cost of actual sorties where that substitution will contribute to readiness requirements.

2.3.6 No-Action Alternative

The No-Action alternative would mean military units would continue to train using the current range and existing airspace. The configuration of the Hardwood Range and restricted airspace R-6904 would remain as they currently exist. However, annual utilization would increase.

Should any of the range changes or airspace additions/modifications considered under the Proposed Action ultimately be excluded from adoption by decision-makers, adoption of the No-Action alternative can be done individually and separately for any component of the alternates.

2.3.6.1 Hardwood Air-to-Surface Gunnery Range

Hardwood Range is located in Juneau County in west-central Wisconsin approximately 20 statute miles north-northeast of Volk Field ANG Base (approximately 80 statute miles northwest of Madison). The range encompasses 7,929 acres of land, is generally flat and surrounded by heavily wooded areas, and is approximately two miles wide by six miles long. The State of Wisconsin leases the land to the Federal government, which licenses the land to the ANG to conduct aircrew training. The airspace directly above the range is R-6904B. R-6904B extends vertically from the surface to 17,000 feet MSL. A second restricted area, R-6904A, surrounds R-6904B and incorporates an area approximately 8 by 9 nautical miles (see Figure 1-2). R-6904A surrounds R-6904B on the north, west, and south and extends from 150 feet AGL to 17,000 feet MSL. The Volk Field CRTC schedules the range.

Approximate geographic coordinates of R-6904A are as follows:

Beginning at	44°18.0'N 89°59.0'W
to	44°10.0'N 89°59.0'W
to	44°10.0'N 90°11.0'W
to	44°18.0'N 90°11.0'W
to	point of beginning, excluding R-6904B.

Approximate geographic coordinates of R-6904B are as follows:

Beginning at	44°15.0'N 89°59.0'W
to	44°13.5'N 89°59.0'W
to	44°13.5'N 90°07.6'W
to	44°15.0'N 90°07.6'W
to	point of beginning.

2.3.6.2 Volk South MOA

This MOA is centered approximately 5 NM northeast of Volk Field and 68 NM northwest of Madison. The MOA adjoins and is south of Volk West MOA and west of the Volk East MOA. The Volk South MOA extends vertically from 500 feet AGL up to, but not including, flight level 180 (FL 180), approximately 18,000 feet MSL. The Volk South MOA is used primarily for low-altitude air-to-air training, air combat training, and access to Hardwood Range.

Approximate geographic coordinates of the Volk South MOA are as follows:

Beginning at	44°10.0'N 89°59.0'W
to	43°40.0'N 89°46.3'W
to	44°00.0'N 90°26.0'W
to	44°00.0'N 90°35.3'W
to	44°00.0'N 90°35.3'W
to	44°00.2'N 90°36.6'W
to	44°00.2'N 90°36.7'W
to	44°01.3'N 90°36.7'W
clockwise	along an arc with a 16 NM radius centered
at	43°56.6'N 90°15.5'W
to	44°12.3'N 90°11.0'W
to	44°10.0'N 90°11.0'W
to	point of beginning.

2.3.6.3 VR-1616

This route begins approximately 62 NM south of Minneapolis and proceeds east into the Hardwood Range. This route is used for visual navigation training that primarily supports air-to-surface training. Table 2-18 describes the route.

Table 2-18. VR-1616 Route Description

ALTITUDE DATA	*POINT*	*LATITUDE/LONGITUDE*	*ROUTE WIDTH (NM) LEFT/RIGHT OF CENTERLINE*	
As assigned	*A*	*43°58.0'N 93°12.0'W*		
500 feet AGL to 1,500 feet AGL	*B*	*44°17.0'N 92°52.0'W*	*A to B*	*2 Left/4 Right*
500 feet AGL to 1,500 feet AGL	*C*	*44°28.0'N 91°50.0'W*	*B to C*	*4 Left/4 Right*
500 feet AGL to 1,500 feet AGL	*D*	*44°24.0N 91°18.0'W*	*C to D*	*4 Left/4 Right*
500 feet AGL to 1,500 feet AGL	*E*	*44°21.0'N 91°04.0'W*	*D to E*	*4 Left/4 Right*
500 feet AGL to 1,500 feet AGL	*F*	*44°23.0'N 90°46.0'W*	*E to F*	*4 Left/2 Right*
500 feet AGL to 1,500 feet AGL	*G*	*44°20.0'N 90°35.0'W*	*F to G*	*3 Left/3 Right*
100 feet AGL to 1,500 feet AGL	*H*	*44°14.0'N 90°05.0'W*	*G to H*	*3 Left/3 Right*

APPENDIX A

CURRENT OPERATIONAL TRAINING REQUIREMENTS

APPENDIX A

CURRENT OPERATIONAL TRAINING REQUIREMENTS

A.1 AIRCRAFT CHARACTERISTICS

Because of its central location and diverse capabilities, 15 or more different types of aircraft use the Hardwood Range and its associated airspace. United Stated Air Force (USAF) aircraft such as the A-10, B-1, B-2, B-52, C-130, F-15, F-16, F-111, and the F-117; and United States Navy aircraft such as the A-6 and F-18 are representative of the types of aircraft flying on the Hardwood Range and within the associated airspace.

The A-10 aircraft was designed for two primary purposes: provide close air support for friendly forces and immobilize enemy armor with its 30 millimeter (mm) gattling gun. The aircraft can carry laser guided and free-fall air-to-surface ordnance in addition to its armor piercing gattling gun.

The B-1 aircraft is a strategic bomber designed for deep penetration into enemy territory. The B-1 has a low-altitude "dash" capability to evade enemy threats at high speed. The aircraft is capable of carrying nuclear and non-nuclear (conventional) free-fall air-to-surface ordnance.

The B-2 aircraft is a stealth technology bomber. Distinctive in its flying wing configuration, the aircraft is capable of flying at high or low-altitudes with a low probability of being detected by conventional radars. The aircraft carries an internal load of free-fall air-to-surface ordnance.

The B-52 aircraft is the oldest operational bomber in the USAF fleet with over 30 years of operational service. The aircraft can carry internally and externally a wide range of free-fall air-to-surface ordnance while operating at very high or very low-altitudes.

The C-130 turboprop aircraft is the USAF's workhorse for inter- and intra-theater airlift. This versatile aircraft is designed to airdrop cargo and/or troops to forward operating locations in all weather conditions.

The F-15 aircraft is designed to achieve and maintain air superiority using an advanced radar system, air-to-air armament, and superior maneuvering capability. The F-15 is capable of flying as low as 100 feet AGL and as high as 60,000 feet MSL in performing its air superiority mission.

The F-15E aircraft, a derivative of the F-15C/D, is designed for air-to-surface ordnance delivery and defense suppression. Designed with an enhanced radar, the aircraft is capable of navigating at low-altitude at night and in all weather conditions to strike targets deep into enemy territory. The aircraft carries a wide range of free-fall and laser guided air-to-surface ordnance.

The F-16 aircraft is equipped with a computerized weapons delivery system. It also has a self-defense and offensive air-to-air combat capability against both fighter and bomber aircraft. It is equipped with a long range air-to-air radar capable of acquiring enemy aircraft at distances of up to 80 NM; missiles can be launched at ranges of 20 NM or more. The F-16 is capable of flying at altitudes as low as 100 feet AGL to evade enemy radar and weapons system detection while en route to and from target areas, and up to FL 500 in order to intercept high altitude enemy aircraft and to avoid low-altitude threats.

The F-111 aircraft is a swing-wing aircraft equipped with a computerized weapons delivery system. The F-111 is designed as an all-weather bomber-type aircraft capable of high speeds and deep penetration into enemy territory. The F-111 is capable of flying day and night as low as 100 feet AGL and as high as 49,000 feet MSL while carrying a large weapons load.

The F-117 aircraft is a stealth technology fighter. The aircraft is designed to fly high or low-altitude with internally carried air-to-surface ordnance while having a low probability of being detected by radar.

The Navy's A-6 aircraft is a multi-purpose aircraft designed for suppression of enemy defenses through electronic counter measures and interdiction with free-fall ordnance. The aircraft's bulbous nose and a curved refueling probe just forward of the cockpit are unique design features of this aircraft.

The F-18 aircraft has a computerized weapons delivery system and an advanced radar system that gives the aircraft an air-to-air and air-to-surface weapons delivery capability. It is equipped with a long range air-to-air radar capable of acquiring enemy aircraft at distances of up to 80 NM; missiles can be launched at ranges of 20 NM or more. Its mission and capabilities are similar to the F-16. The F-18 is capable of flying at altitudes as low as 100 feet AGL to evade enemy radar and weapons system detection while en route to and from target areas, and up to 50,000 feet MSL to intercept high altitude enemy aircraft and to avoid low-altitude threats.

The C-580 is a medium-sized, specially equipped, twin-engine passenger transport aircraft that will be used in conjunction with other aircraft for special operations. It does not have any ordnance release capability. Its primary function with Hardwood Range is to record information.

The RF-4 is a reconnaissance version of the multi-purpose F-4 aircraft. The RF-4 is a tandem cockpit, twin-engine aircraft designed for photographic missions. The aircraft does not carry any free-fall ordnance.

Several types of rotary wing aircraft (i.e., helicopters) could also operate on the range. These aircraft fly administrative support missions (e.g., explosive ordnance disposal) in addition to providing airborne support for simulated ground forces.

A.2 TRAINING ACTIVITIES ASSOCIATED WITH THE PROPOSED ACTION

The following subsections describe the various types of training required of military aircrews and identify the types of military airspace within which this training should occur. Also addressed are airspace configuration requirements associated with the training.

A.2.1 Typical Training Missions on Air-to-Surface Ranges

To simulate the delivery of live air-to-surface weapons, aircrews fly missions to training ranges where they practice dropping training munitions. The USAF mandates this training to keep aircrews combat ready. To maintain combat ready proficiency, simulated tactical weapons delivery missions are flown frequently by each pilot in the unit.

At the Hardwood Range, training events simulate the delivery of MK82 (500-pound bomb) and MK84 (2,000-pound bomb) weapons in both low drag and high drag (air inflatable retarder) configurations. Simulating the presence of different ground threat systems, aircrews practice weapon deliveries from several altitudes and dive

angles. Release altitudes range from 250 feet AGL to 15,000 feet AGL. No full-scale, explosive munitions are used on the range. A 25-pound practice bomb, the BDU-33, is used to simulate the full scale munitions. The BDU-33 contains a white smoke charge that ignites on impact to aid in scoring the accuracy of the weapons delivery. Normally, aircraft on simulated weapons delivery missions are loaded with six BDU-33s, allowing several events to be practiced and scored on each mission.

Aircraft are also loaded with target practice ammunition with inert projectiles for strafe practice. Aircrews fire the ammunition on two practice strafe passes on each mission. The following scenarios describe the typical missions that would be flown on Hardwood Range.

A.2.1.1 Scenario 1—Basic Weapons Delivery

At the conclusion of low-altitude training, a flight would enter the basic weapons delivery pattern. The basic delivery pattern consists of a rectangular ground track with a final delivery leg, off-target climbing turn to downwind, and a base leg leading to the final delivery leg for subsequent deliveries. A flight of four aircraft can practice weapons delivery during the same range period. They would space themselves about 15 to 20 seconds apart around the pattern.

A.2.1.2 Scenario 2—Low to Medium Altitude Tactical Weapons Delivery

A flight of four aircraft would proceed to Hardwood Range at low altitude along an MTR or at medium to high altitude (above 15,000 feet MSL). The training objective is to strike the target from a direction unfamiliar to the pilot. This is known as a first run attack. Before entering R-6904, the flight would fly over a known point on the ground approximately 10 to 12 NM from the target. From that point, the flight would fly a precise ground track to a point approximately 5 NM from the target. From that point, one or more aircraft would climb to an appropriate altitude (varying up to FL 250) to begin a weapons delivery from a 10 to 45-degree dive angle. The aircraft would release their ordnance at an altitude that would keep them above simulated small arms weapons firing. After the initial delivery, the flight would continue to practice tactical weapon deliveries on Hardwood Range. At the conclusion of the range mission, the four aircraft would egress from the target area and return to Volk Field or their home station.

A.2.1.3 Scenario 3—High Altitude Dive Bomb Release

A flight of four aircraft would proceed to Hardwood Range occasionally at low altitude but normally at medium to high altitude (above 15,000 feet MSL). The training objective is to release ordnance on target and to stay above 10,000 feet AGL. Each aircraft would proceed to the target area and climb, if necessary, to between FL 200 and FL 300 to visually acquire the target. Once the target is seen, the aircraft would maneuver to a position from which a 30 to 40-degree dive angle can be achieved. The aircraft would then establish the desired dive angle and release the ordnance at an altitude that would ensure the aircraft remains above 10,000 feet AGL. After the initial delivery, the flight would continue to practice weapon deliveries on Hardwood Range. At the conclusion of the range mission, the four aircraft would egress from the target area and return to Volk Field or their home station.

A.2.2 Typical Training Missions on Drop Zones and Assault Landing Strips

Drop zones are designated areas that are used by military aircrews to conduct airdrop cargo and personnel operations. Assault landing strips are often associated

with drop zones and are designed to develop aircrew proficiency through realistic short field landings. A drop zone and an assault landing strip are required to provide airlift aircraft, such as the C-130, a designated area to practice insertions/extractions of airlift cargo. Several types of airdrop training missions are associated with military drop zones, including Container Delivery System (CDS), Standard Airdrop Training Bundle (SATB), heavy equipment, and personnel airdrops.

A.2.2.1 Container Delivery System Airdrops

CDS airdrops are single or multiple A-22 type containers that weigh from 500 to 2,200 pounds and are gravity released from the rear of the aircraft by cutting a restraint and keeping the nose of aircraft upward. The CDS airdrops occur at approximately 400 feet AGL and are usually water-barrel drops weighing from 900 to 1,000 pounds. The CDS bundle would contain barrels of water that could be drained at the drop zone site and easily transported back to their original location. Occasionally, actual CDS containers of food and water may be dropped. In this case, the CDS containers may weigh more or less than the normal amount but would not exceed the 2,200 pound limit.

A.2.2.2 Standard Airdrop Training Bundle Airdrops

SATB airdrops are 15-pound sand bags that are released to simulate personnel, equipment, door bundles (DB), or CDS airdrops. The SATB airdrops occur at a range of 400 to 1,000 feet AGL.

A.2.2.3 Heavy Equipment Airdrops

Heavy equipment drops vary in weight from 4,500 pounds to 40,000 pounds. They are extracted from the rear of the aircraft by parachute, normally at 600 feet AGL. The heavy equipment dropped ranges from Armored Personnel Carriers to light artillery.

A.2.2.4 Personnel Airdrops

C-130 aircraft are tasked for wartime and peacetime personnel transport operations. C-130 aircraft transport personnel such as paratroopers into designated areas (i.e., insertion operations). This type of airlift support could be for guerrilla assault warfare in wartime or humanitarian relief during peacetime or emergency operations.

A.2.2.5 Assault Landings/Personnel Extraction Operations

Assault landings typically consist of a steep approach to an unimproved landing surface (i.e., a dirt runway) to simulate a high-threat situation. The landing is terminated with a minimum ground roll. Assault landings are practiced on assault landing strips. These missions deliver equipment or personnel with a minimum time on the ground. C-130 aircraft also extract personnel from designated areas in extraction missions that range from medical support to combat troop operations.

A.2.2.6 Flight and Ground Operations

The lowest altitude for drop zone approaches is usually 400 feet AGL. Most flights enter and leave drop zones above this 400-foot AGL minimum altitude. Aircraft remain at the lowest approach altitude during an airdrop for an average duration of one minute, covering a distance of approximately two miles. Utilization is usually restricted

to visual only drops. Under no situation would a drop be undertaken using instrument conditions. Within visual drop zone parameters, both the pilot and the navigator must concur about the drop point. The crew would be restricted from actuating a drop when site visibility is questionable.

Ground operations associated with airdrop training consist of a drop zone support team of two to eight personnel who identify the drop location for the aircrews and recover drop materials. For daytime operations, the support team would use a raised angle marker (RAM), smoke grenades, mirrors, or any combination of these three to mark the drop zone. A RAM is a portable fabric marker, erected similar to a tent, and made from highly visible fabric. Smoke grenades are used to aid visibility and are placed in non-flammable containers to prevent ignition of local combustibles, such as grass or weeds. Signaling mirrors may also be used. For operations after sunset, small battery operated lights are used to form a block letter on the ground, and signaling lights similar to spot lights are used to direct aircraft to the drop zone.

Equipment required to remove the airdrop training loads is determined by the type of airdrop being conducted. For DB and SATB airdrops, only two personnel and one truck are required to recover the sand bags or containers released from the aircraft. For actual CDS drops, four to eight personnel, a fork lift, and a flat bed truck are required to recover the containers. In addition, a designated drop zone truck, equipped with radios for communication with aircraft as well as with the command post, fire extinguishers, smoke grenade containers, and an emergency medical kit are required.

A.2.3 Typical Training Missions Along MTRs

A.2.3.1 Low-Altitude Navigation

Navigation by reference to ground features is especially demanding at high speeds and low-altitude because of the limited ability to see terrain features beyond a short distance from the line of flight. Even with today's inertial navigation systems, pilots must be able to cross-check their navigation progress to detect system errors. When weather permits low-altitude flight, pilots practice terrain masking, attempting to hide the fighter aircraft from simulated radar sites by keeping physical terrain features between the flight path and the radar site. Furthermore, navigation at low-altitude and high speed requires regular practice to maintain proficiency, increase situation awareness, and manage stressful flight factors (i.e., task saturation).

Night navigation training is also accomplished under simulated or actual low visibility conditions with the use of onboard sensors, such as ground mapping radar, terrain following radar, and infrared or low-light television sensors providing reference to ground features. Where training allows, pilots practice terrain masking. Furthermore, navigation at low-altitude and high speed in night and deteriorating weather conditions requires regular practice to maintain proficiency, increase situation awareness, and avoid task saturation. MTRs designed for either visual or instrument conditions are used for these types of navigation training and assessed for night use.

A.2.3.2 Low-Altitude Step Down Training

Fighter aircrews must train to fly at very low-altitudes to allow for safe, survivable, and effective tactical navigation and weapons delivery. Step down training is used to practice aircraft maneuvers at an altitude at which a pilot is comfortable to gradually develop proficiency skills at altitudes as low as 100 feet AGL. Pilots use terrain features to avoid detection by airborne and land-based radar systems. They must learn to navigate at low-altitude while maintaining tactical formation to provide maximum

self defense capability. Hard turns, along with climbs and dives, need to be practiced frequently to maintain low-altitude maneuvering proficiency.

A.2.3.3 Visual and Radar Lookout Training

Aircrews flying to or from a target area on an MTR practice visual and radar lookout procedures to detect and avoid, or defeat interceptor aircraft, as described in Subsection 3.2.3.3. This training is usually performed during formation flight. In formation, two to four aircraft maintain visual separation allowing wingmen to provide visual lookout for each other to cover areas that cannot be seen from a single aircraft.

These training scenarios improve radar and visual lookout techniques. Realistic training scenarios should allow virtually unrestricted flight throughout an altitude structure from cruising altitude to the lower altitude of the training routes. The Proposed Action would substantially improve the quality and efficiency of training.

A.2.3.4 Surface Attack Tactics Training

This scenario consists of two or more attack aircraft performing low-altitude navigation on an MTR. The aircraft simulate weapons deliveries against a target. Targets are stationary, strategic objects, such as bridges and railroad yards. An attack includes passes by each aircraft over the target, time-sequenced to provide safe separation during a simulated weapon delivery.

Precise timing during the ingress to the target is practiced, as is target acquisition from a level approach between 500 feet AGL and 1,000 feet AGL. Aircraft flying at these altitudes are simulating a high-threat environment. At a planned point, the aircraft begins a rapid climb to visually acquire the target. From the maximum altitude, the aircraft makes a simulated low-angle weapons delivery (between 10 to 20 degrees) or a high-angle weapons delivery (between 30 to 45 degrees).

Egress tactics from the target area are also practiced within the airspace boundaries of an MTR. Aircrews practice returning to low altitude as quickly and safely as possible while regaining their desired low-altitude tactical formation.

A.2.4 Typical Training Missions In MOAs

A.2.4.1 Low-Altitude Surface Attack Tactics

Scenario 1 - Simulated Weapons Delivery

This scenario consists of two or more attack aircraft performing low-altitude navigation on an MTR leading into a MOA or restricted area. The aircraft simulate a variety of weapons deliveries against a target. Targets are stationary, strategic objects, including bridges and railroad yards. An attack includes passes by each aircraft within the flight, time sequenced over the target to provide safe separation during a simulated weapon delivery. If the surface attack tactics are practiced within a weapons delivery range, such as Hardwood Range, practice munitions can be expended and delivery accuracy analyzed.

Precise timing during the ingress to the target is practiced, as is target acquisition from a level approach between 500 feet AGL and 1,000 feet AGL. Aircraft flying at this altitude are simulating a high-threat situation. At a preplanned point, the aircraft begins a rapid climb to 3,000 to 5,000 feet AGL, and occasionally up to 12,000

feet AGL, to visually acquire the target. From the maximum altitude, a simulated low angle weapons delivery between 10 to 20 degrees, or a high angle delivery between 30 to 45 degrees of dive angle, is made.

Egress tactics from the target area are also practiced. Aircrews practice returning to low-altitude as quickly and safely as possible while regaining their desired low-altitude tactical formation. Surface attack tactics can be enhanced by the addition of a threat aircraft attempting to disrupt or negate an attack.

Scenario 2 - Close Air Support

This scenario normally consists of two aircraft performing low-altitude navigation on an MTR leading into a MOA or restricted area. This mission is flown to support ground-based U.S. Army or Marine forces in close proximity to enemy forces. Approaching the MOA or restricted area, the aircraft establish radio contact with a Forward Air Controller (FAC) who gives the flight a situation briefing. The situation briefing includes the location of friendly and enemy troops, the ground commander's objectives, and the location of any known surface-to-air threats. The FAC will also restrict the flight's operations, as necessary, to ensure the safety of friendly troops. The close air support aircraft simulate carrying ordnance appropriate for supporting the ground commander's objectives.

The close air support aircraft enter the simulated target area in one of two ways. One way is a high altitude entry from approximately 5,000 feet AGL to orient themselves based on the FAC's situation briefing. After establishing the exact location of friendly troops, the close air support flight will simulate delivering ordnance as the FAC directs. The FAC, who is in constant radio contact with the ground commander, will designate the impact point for each ordnance delivery based on the effectiveness of each weapons delivery. After expending the simulated ordnance, the flight departs the target area at medium or high altitude.

A second entry is from a pop-up maneuver, simulating a high ground threat situation. This type entry begins with the aircraft at low-altitude (approximately 500 feet AGL) to avoid detection by enemy radar and visual acquisition. At a preplanned point, the aircraft begins a rapid climb to 3,000 to 5,000 feet AGL, and occasionally up to 12,000 feet AGL, to visually acquire the target. From the maximum or apex altitude, a simulated low angle weapons delivery between 10 to 20 degrees is made. After expending the simulated ordnance, the flight departs the target area at medium or high altitude.

A.2.4.2 Air Combat Training

Air combat training involves at least two and usually four aircraft practicing the maneuvers and fundamentals of offensive and defensive aerial attack. Pilots learn the capabilities of threat aircraft and weapons systems while employing tactics to exploit an adversary's weaknesses. Two or more aircraft may operate as a team to enhance detection of adversary aircraft, defeat attacks, and maneuver as a mutually supportive element to negate and destroy the adversary forces. Aircraft simulate air-to-air ordnance launches during such training.

Airspace used for air combat training must be large enough to permit realistic offensive and defensive tactics. If the area is too small, pilots can be distracted by the need to constantly monitor their proximity to airspace boundaries. Additionally, aircrews need to exercise the onboard radar to its maximum extent for realistic training. The *USAF Airspace Master Plan* suggests the area should be 60 NM wide and 70 NM long, extending vertically to FL500.

Air combat training is flown above 5,000 feet AGL throughout the altitude structure available in the training airspace. A typical scenario involves opposing forces, with one group defending an area while the other group attempts to pass through the defended area or engage the defensive group. The goal of air combat training is to refine pilot skills in radar and visual lookout as well as offensive and defensive employment of tactics and weapons. Air combat tactics, air combat maneuvering, and basic fighter maneuver training also refine pilots' air-to-air skills.

Air combat tactics training requires three or four aircraft. This scenario involves designating friendly and enemy forces, which separate as far as possible in the maneuvering airspace to begin tactics training. The training begins with opposing forces coming toward each other within specified altitude bands to ensure safe separation. The purpose of this training is team work, targeting and sorting, and intercept tactics to enhance survival. If two different type aircraft train together, the training is called dissimilar air combat tactics.

Air combat maneuvering training usually involves three similar aircraft. This training emphasizes intra-flight coordination, survival tactics, and two-ship maneuvering against a single adversary. The training scenarios vary by having the adversary either within visual range or beyond visual range dependent on the specific training objectives.

Basic fighter maneuvering is the fundamental training of all air-to-air flight maneuvering. This training is normally conducted with two similar aircraft to practice individual offensive and defensive maneuvering against a single adversary. Offensive and defensive aircraft maneuvering and weapons employment are emphasized on these missions.

A.2.4.3 Low-Altitude Air-to-Air Training

Low-altitude air-to-air training normally involves two to four aircraft practicing the maneuvers and fundamentals of offensive and defensive aerial attack. This mission is usually flown in conjunction with other training missions such as surface attack tactics or low-altitude intercepts.

Low-altitude air-to-air training is conducted below 5,000 feet AGL. A typical scenario involves designating one or more aircraft as interceptor, tasked to locate and intercept a low-altitude flight of aircraft en route to a target. Participants are at minimum altitude for very short periods of time. The ingressing aircraft must detect and react appropriately to negate the interceptor's attack and proceed to the target area. Maneuvering is restricted because of the aircraft's proximity to the ground. Training is optimized when the interceptors are dissimilar (different type) aircraft to differentiate friend/foe roles. The goal of low-altitude air-to-air training is to refine pilot skills in radar and visual lookout and maneuvering required at low-altitude to negate an attack. Low-altitude air-to-air training also provides valuable training for the interceptor in low-altitude intercept tactics and techniques. Low-altitude air-to-air training is most realistic when conducted over land because pilots are required to be constantly aware of changing terrain elevation and obstacles. This training also increases a pilot's depth perception acuity.

Airspace used for low-altitude air-to-air training must be large enough to permit realistic offensive and defensive tactics. If the area is too small, pilots can be distracted by the need to constantly monitor their proximity to airspace boundaries. In addition, smaller airspace concentrates noise over any one location. For low-altitude air-to-air training, a MOA for orbiting defensive aircraft combined with one or more MTRs for the ingressing/egressing aircraft provides the most realistic training

opportunity. The *USAF Airspace Master Plan* suggests the optimum airspace for this type training would be 70 NM long and 60 NM wide below 5,000 feet AGL.

A.2.4.4 Low-Altitude Step Down Training

This is the same training as described in Subsection A.2.3.2.

A.2.4.5 Intercept Training

Radar-equipped fighter aircraft can train at altitudes as low as 100 feet AGL and up to 50,000 feet MSL to detect, intercept, identify, and if necessary, destroy hostile aircraft. In a typical training scenario, the interceptor(s) and target(s) are positioned beyond the expected detection capability of the interceptor's on-board radar. The target aircraft attempts to penetrate the area protected by the interceptor. The interceptor, in many cases with the aid of ground-based or airborne radars, attempts to detect the target, maneuver to identify the aircraft, and reach a position from which armament could be successfully employed. Airspace for intercept training should have at least one dimension large enough to position interceptor and target beyond the radar detection range of each aircraft. During low-altitude intercept training, participants operate at minimum altitude for very short periods of time. The *USAF Airspace Master Plan* suggests the optimum airspace for this type training would be 70 NM long and 60 NM wide, extending vertically up to FL 500.

A.2.5 Frequency of Training Operations

Units that fly training missions on Hardwood Range, in the Volk South MOA, and in VR-1616 typically fly Tuesday through Saturday, with an expanded weekend training program once each month. A typical flight schedule for an ANG unit would consist of up to 16 sorties per day Tuesday through Saturday. Flying units conduct monthly Unit Training Assemblies on weekends during which as many as 36 sorties would be flown on Saturday and 12 on Sunday. Once every three months, the unit typically flies as many as 12 additional sorties on Sunday. In the 12-month period ending May 31, 1994, 3,401 aircraft utilized the Hardwood Range and 185 aircraft used the Volk South MOA.